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ABSTRACT

This report analyzes the relationship between high school grades, American College Test (ACT) scores, and first-semester college grades. Based on the Standard Research Service of the ACT program, 1,379 students in the fall 1969 freshman class of Montgomery College (Maryland) were studied. Measures of academic background used ACT scores in English, mathematics, social science, and natural science, and high school grades in those areas. It was found that: (1) academic success is predicted more accurately for career students than for transfer students, with grades the best predictor; (2) ACT scores are more efficient in predicting the college grades of transfer students; and (3) grades and ACT scores are useful in counseling students, but should not be used as the only criteria. Implications for a system of grading and placement are discussed, as are the use of high school grades for placement, internal criteria of grades, and the remediation system. Complete tables showing experimental details are included. (CA)

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GRADES -- SCORES -- PREDICTIONS

A Study of the Efficiency of High School Grades and American College Test Scores in Predicting Academic Achievement at Montgomery College

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MONTGOMERY COLLEGE

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SEP 14 1971

CLEARINGHOUSE FOR
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INFORMATION

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GRADES -- SCORES -- PREDICTIONS

"Our primary concern with quality must be in the results as shown in our students...we are devoted to the total growth of the individual rather than simply the more narrow scope of course and program objectives. Our open door policy results in a student body with a diversity of backgrounds and educational abilities. Hence we do not demand excellence at the entry level nor do we expect superior performance from all at the completion of their work. The aim is the maximum development of the potential of each student insofar as possible, given the limits of time, human abilities, and resources."

from The Quest for Excellence
Takoma Park Campus Assembly 1971

Introduction

To determine if we are actually reaching the goal of "maximum development of the potential of each student..." it is necessary to have available many kinds of information related to student potential and achievement. What is the academic background of the students who enter Montgomery College as freshmen; how well do these students achieve during their first semester; and what is the relationship between their academic background and their college grades? If these same students had attended other colleges, would they have done as well or are there unique circumstances at Montgomery College which cause major differences? If major differences do exist, where do they lie and are they part of the overall policy of the College? The answers to these questions will do much to aid us in judging how well we reach our stated goals.

Of even greater interest are questions regarding the predictability of student success. Is it possible to predict with some degree of confidence how a student with a given academic background will do in college? Is academic

background a sound basis for counseling a college student into a remedial program or an academic curriculum? Will a student do better in certain courses due to different grading standards employed by the various departments of the College or is there a uniform grading system employed throughout the college?

These and many other questions were studied by the Office of Institutional Research using as a population the students who entered the College as freshmen in the fall of 1969.

The design of the study was based on the Standard Research Service of The American College Testing Program.[1] Eight measures of academic background were considered: four of these were ACT scores (English, Mathematics, Social Studies, Natural Science); the other four were the high school grades in these four areas reported by the student at the time he wrote the examination. These eight measures are regarded as "academic potential" or as "academic predictors", since they are used to infer the type and level of academic success which a given student may be expected to achieve in college.

First semester college grades for each student were reported using a four-point system (A=4, B=3, C=2, D=1, F=0). An overall grade point average (GPA) was reported for each student in addition to the first semester grade for English 101, Mathematics 112, History 103, and Biology 101.

In order to take advantage of the subgroup feature of ACT's Standard Research Service, each student was identified as being in three of six subgroups (Male/Female, Career/Transfer, Full-time/Part-Time). This provided an opportunity to compare the students within the various subgroups.

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[1]Donald P. Hoyt, Leo A. Munday, Your College Freshmen (Iowa City: The American College Testing Program, 1969), pp. 55-93.

Since the computer program used in the study required that a minimum of ninety students be included in each subgroup, it was not possible to compare all groups on the basis of all the college course grades. Female, career oriented, or part-time students did not enroll as frequently in Math 112, History 103, or Biology 101 as did their counterpart groups. Therefore, the most comprehensive analysis is provided for the student who is either male, full-time, or transfer oriented.

The population of this study was drawn entirely from first-time college students who entered Montgomery in the fall of 1969. The sample of 1379 students was drawn from the 2126 students included in Freshman Profiles 1969.

Excluded from the study are foreign students, total withdrawals, and students with atypical patterns such as a part-time student enrolled only in physical education and freshman seminar. Grades of "Incomplete" and "Withdrawn Failing" were not used to compute the GPA. Part-time status was based on each student's course load at the end of the semester which means that some of these students may have begun the semester with twelve or more hours and subsequently dropped courses for various reasons. The difference between the full-time and part-time student may be partially the result of this self-selection process.

THE FINDINGS

High School Grades

It is well documented that students in Montgomery County public high schools receive lower grades in relation to their standardized test scores than do students in most high schools throughout the country. This must be kept in mind as high school averages are reviewed.

On Figure 1 the four self-reported high school grades have been averaged for each of the groups of the 1969 freshman class. It is obvious that these grades center around the 2.0 or "C" level and that full-time, female, career students tend to have the higher averages.

Figure 2 compares MC freshmen with a national sample of students who enter college, and it can be seen that the high school grades in the four subjects (English, Mathematics, Social Science, and Natural Science) tend to be lower for the local students. Full-time and part-time students were compared in order to discover if their grades varied and if high school grades were possibly effective in determining the course load of freshmen.

It is interesting to note the consistency of high school grades earned by entering Montgomery College students. Except for English, the difference between the two groups of MC students is quite small as far as high school grades are concerned.

American College Test Scores

As Montgomery College enrolls an increasing proportion of the county's high school graduates each year, the mean ACT scores of all entering

students conform to the national norms for two-year college students.[2] Previous Montgomery College mean ACT scores were closer to the norms for all college and university freshmen.[3]

Full-time, female transfer students tend to score highest in English (Figure 3) and their 18.3 score differs from the national norm of 19.2 by less than one point.

In Mathematics the male students score highest. And, if they are full-time, transfer-oriented, their chances of having a high score are better (Figure 4). Male students also scored highest on their social science (Figure 5) and natural science (Figure 6) tests compared to all other subgroups. Part-time students tend to have the lowest English scores. The part-time student also appears to have trouble in mathematics.

The composite ACT score is an average of the separate scores (Figure 7). Generally, full-time, male transfer students score highest on standardized tests such as the ACT with the exception of English. Full-time and part-time students differ by 3.38 points on the average in their ability to score on such tests (Figure 8). A difference of more than one point is considered substantial. Since their status was indicated at the end of the semester, rather than at the beginning, it is impossible to say how much of the decision to enroll in a lighter course load was made before registration due to pre-enrollment counseling and how much of the students' decision to reduce their course load was made during the semester once it appeared they were in academic trouble. Whichever the case, a reduced course load is one way to compensate for ability differences as indicated by low test scores.

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[2]Donald P. Hoyt, Leo A. Munday, Your College Freshmen, "Interpretive Guide to ACT Research Services for Higher Education," The American College Testing Program, Iowa City, Iowa, p. 191.

[3]Ibid., p. 195.

FIGURE 1

Means of Four High School Grade Averages (HSA) by Selected Groups of Students

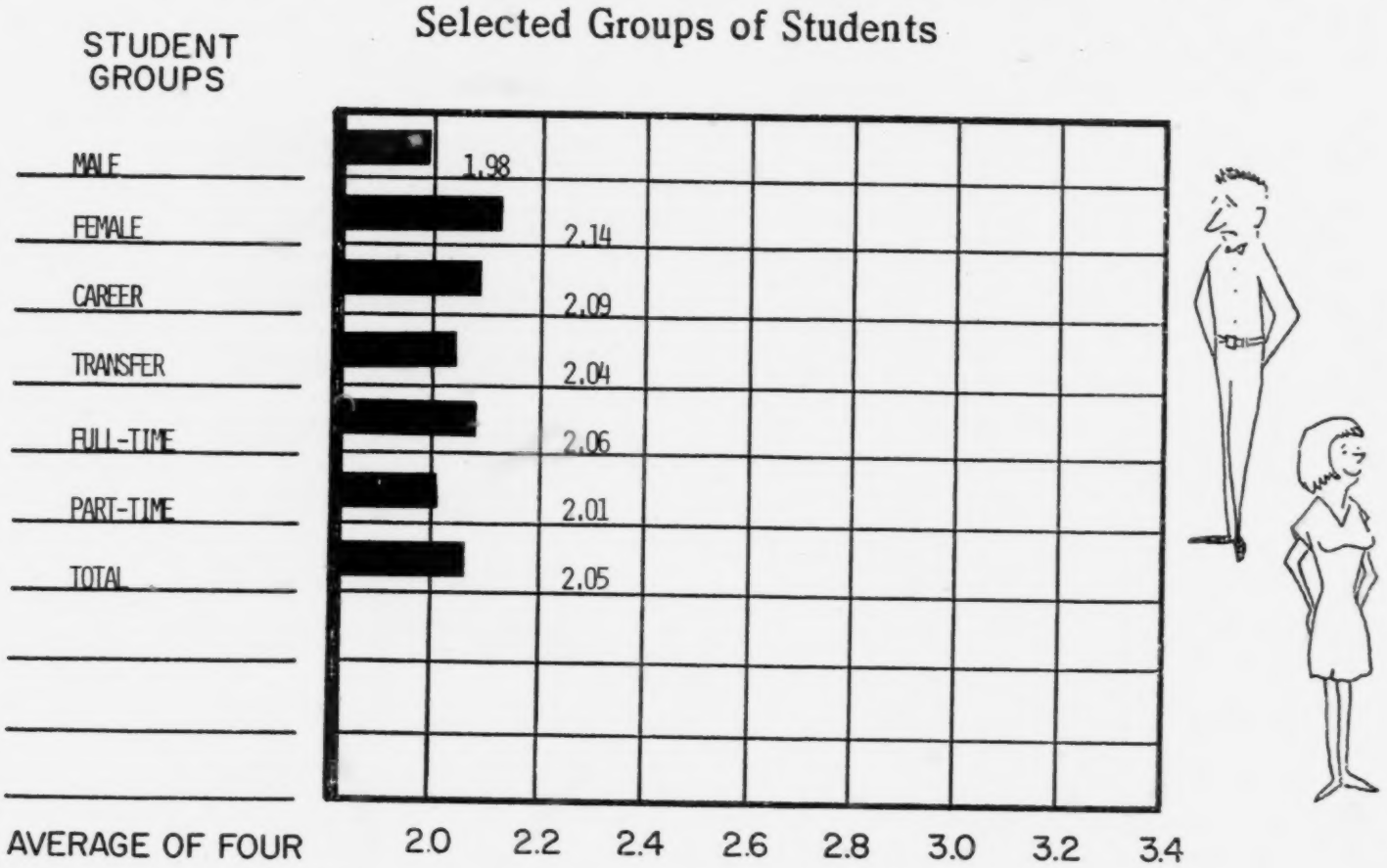


FIGURE 2

Comparison of the Mean High School Grades for Full-Time and Part-Time Montgomery College Freshmen with National Norms

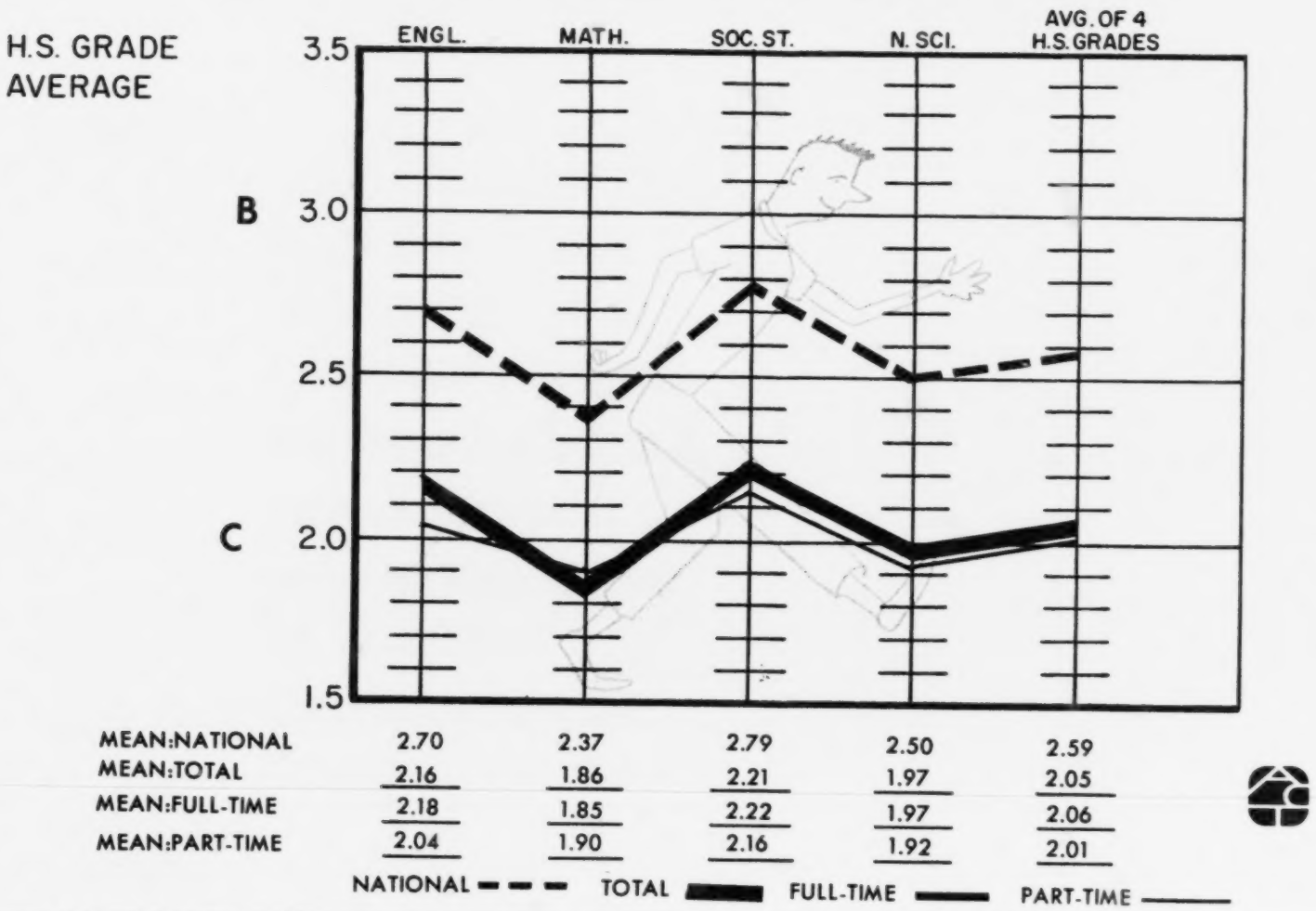


FIGURE 3

Mean ACT Scores by Selected Groups of Students

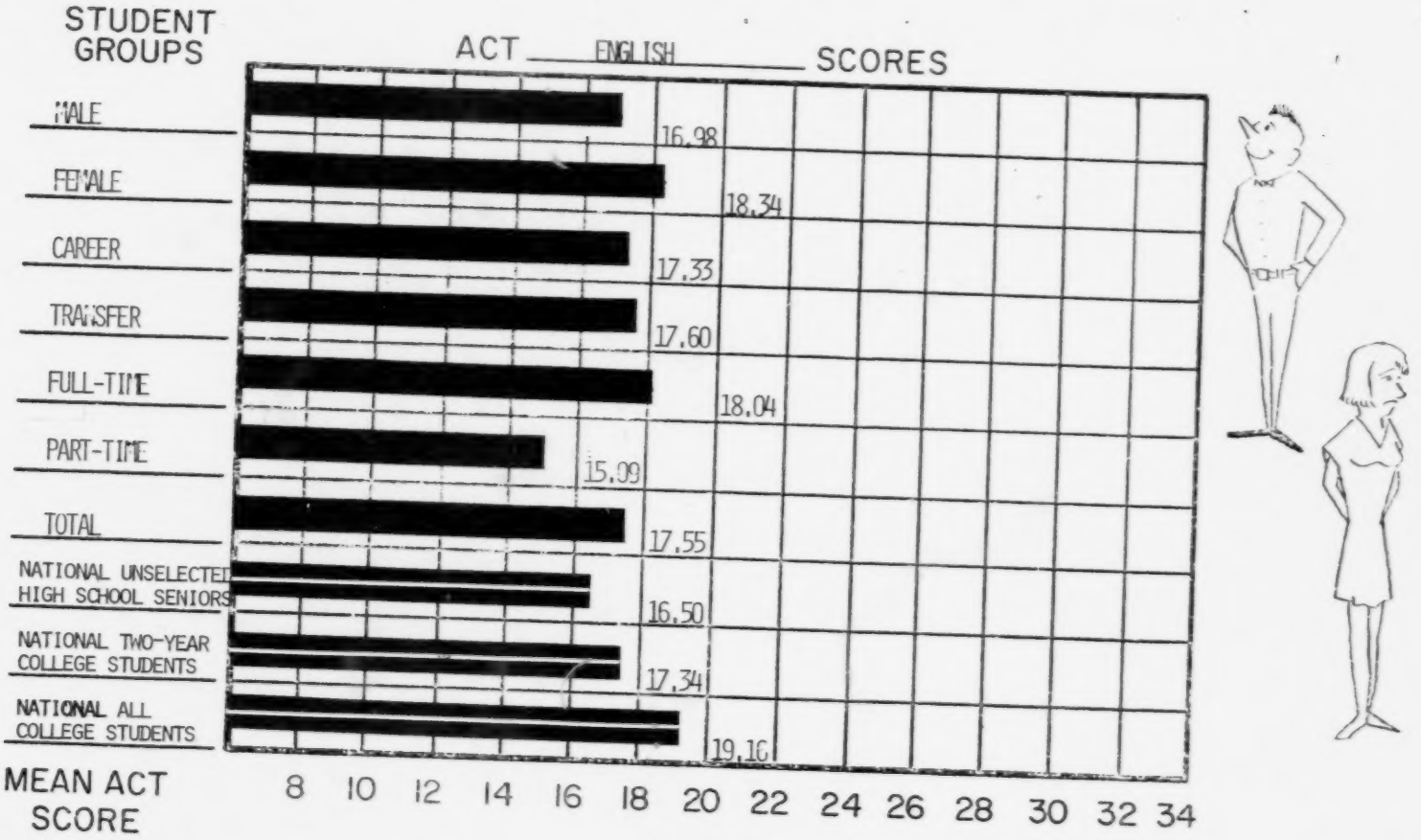


FIGURE 4

Mean ACT Scores by Selected Groups of Students

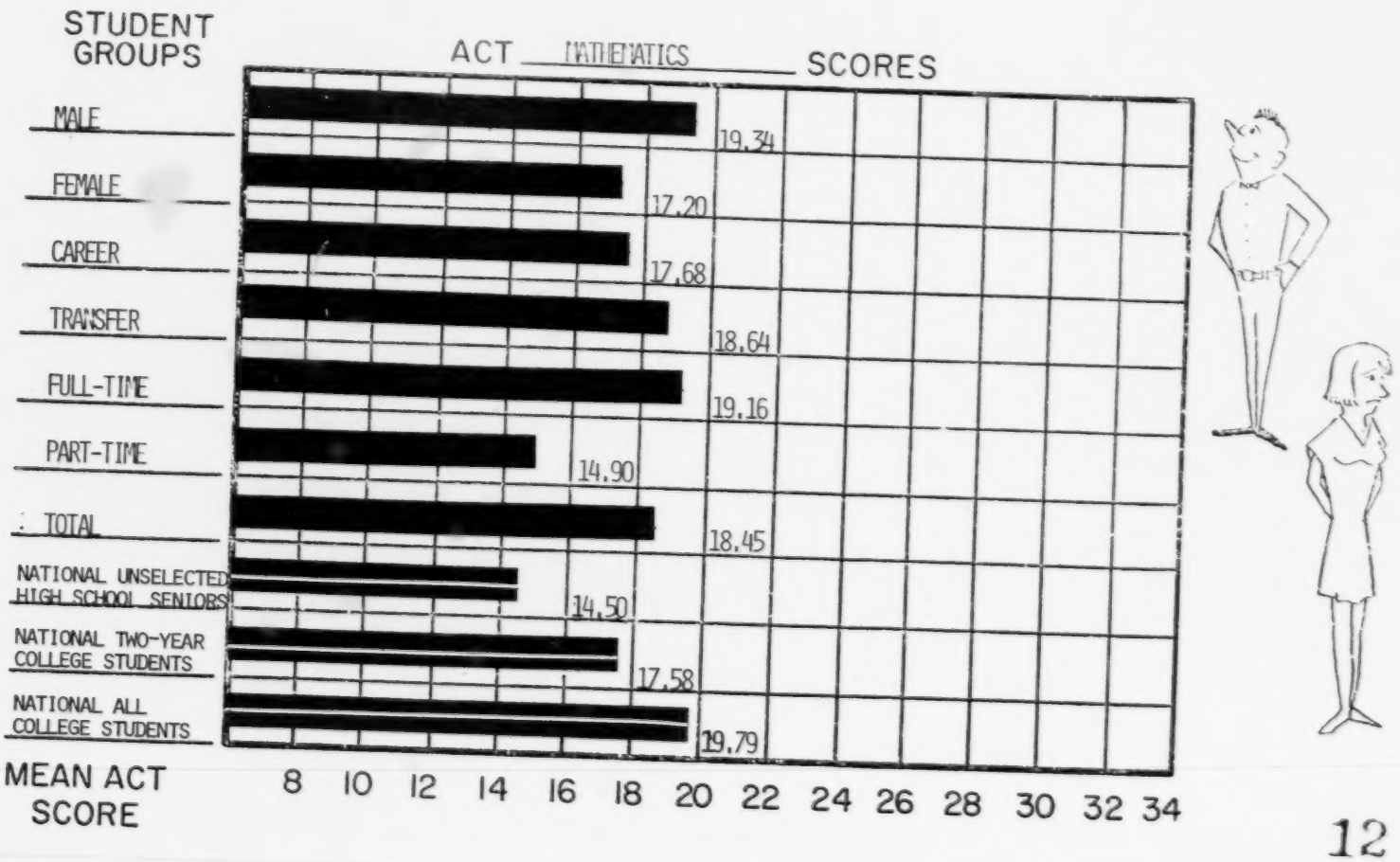


FIGURE 5

Mean ACT Scores by Selected Groups of Students

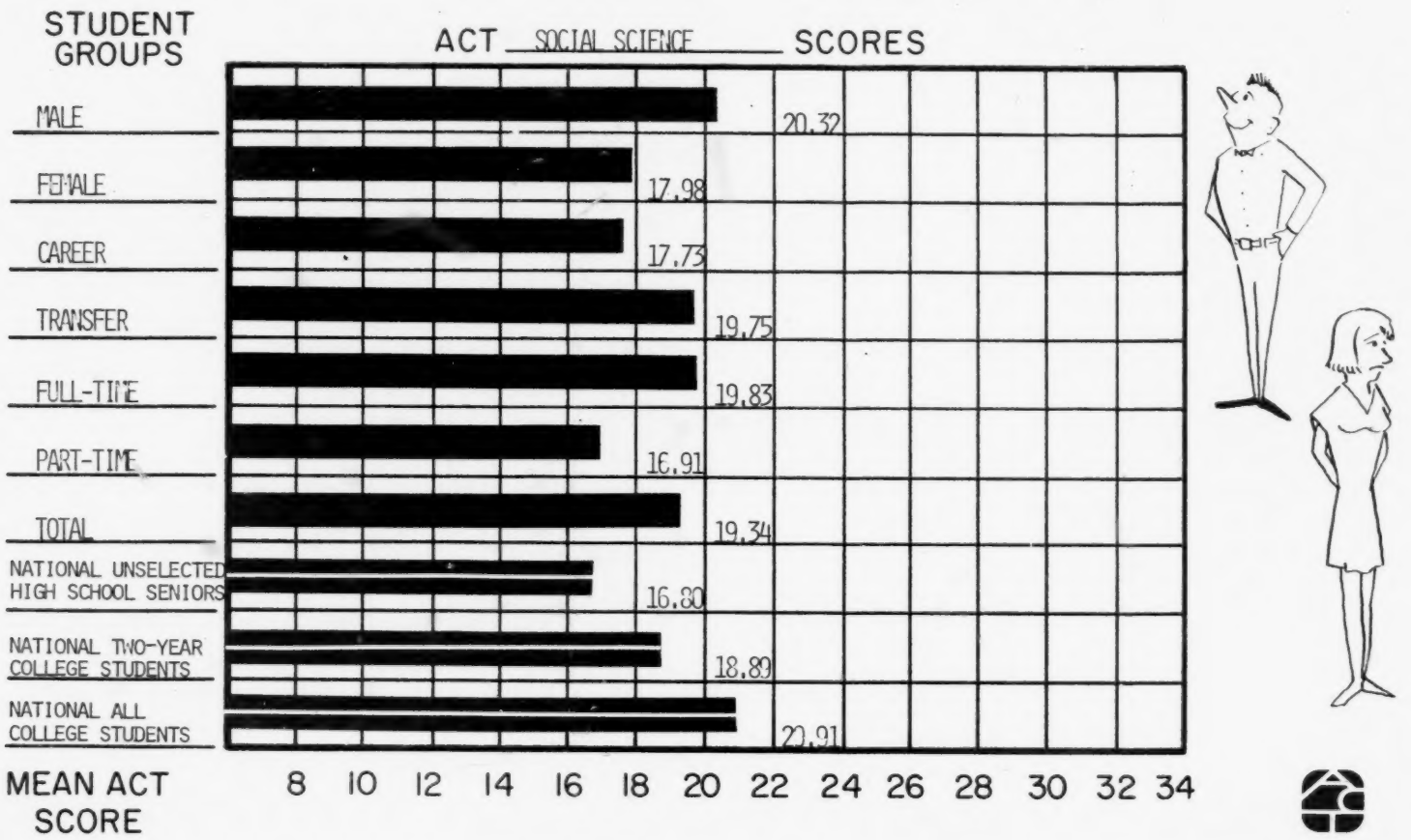


FIGURE 6

Mean ACT Scores by Selected Groups of Students

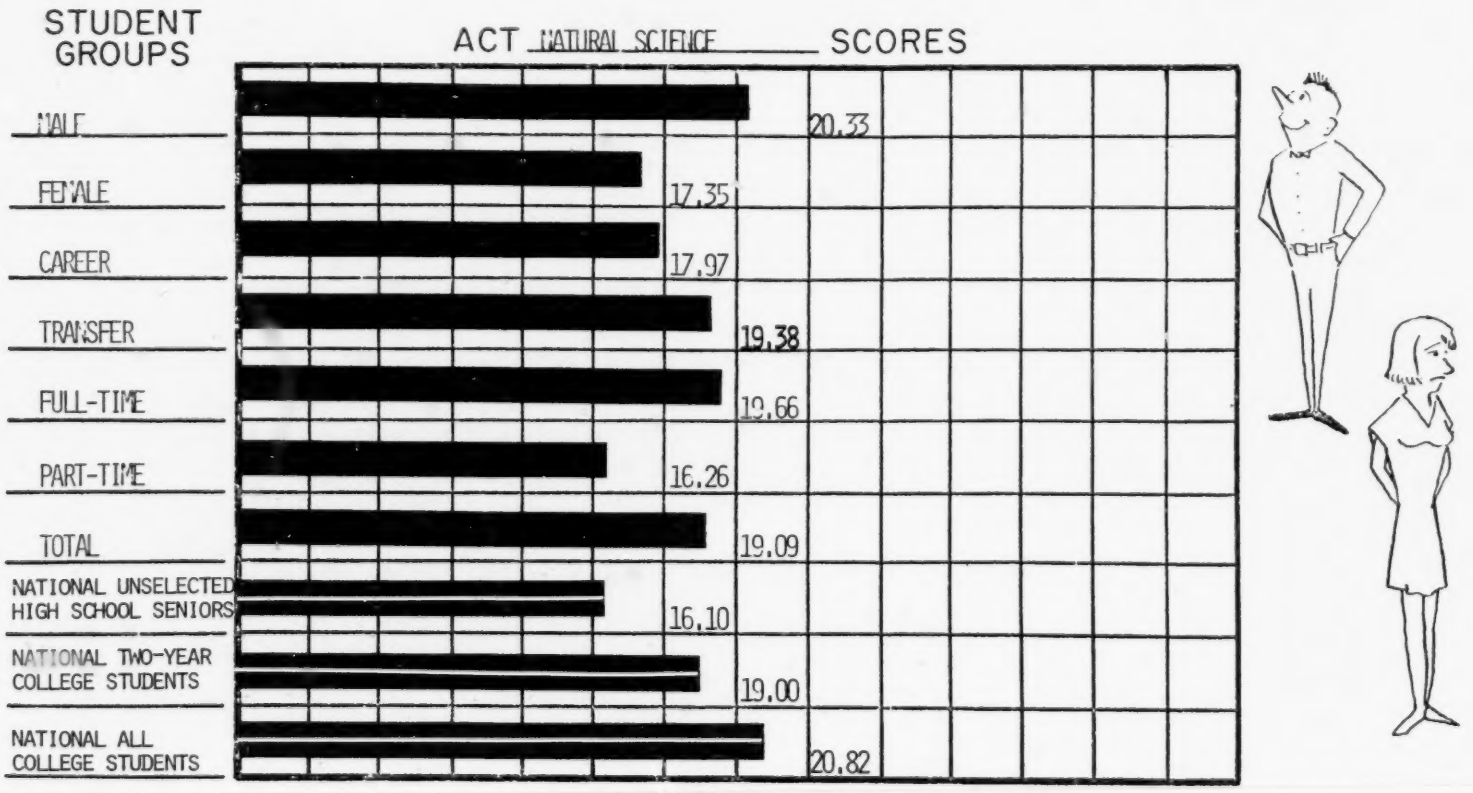


FIGURE 7

Mean ACT Scores by Selected Groups of Students

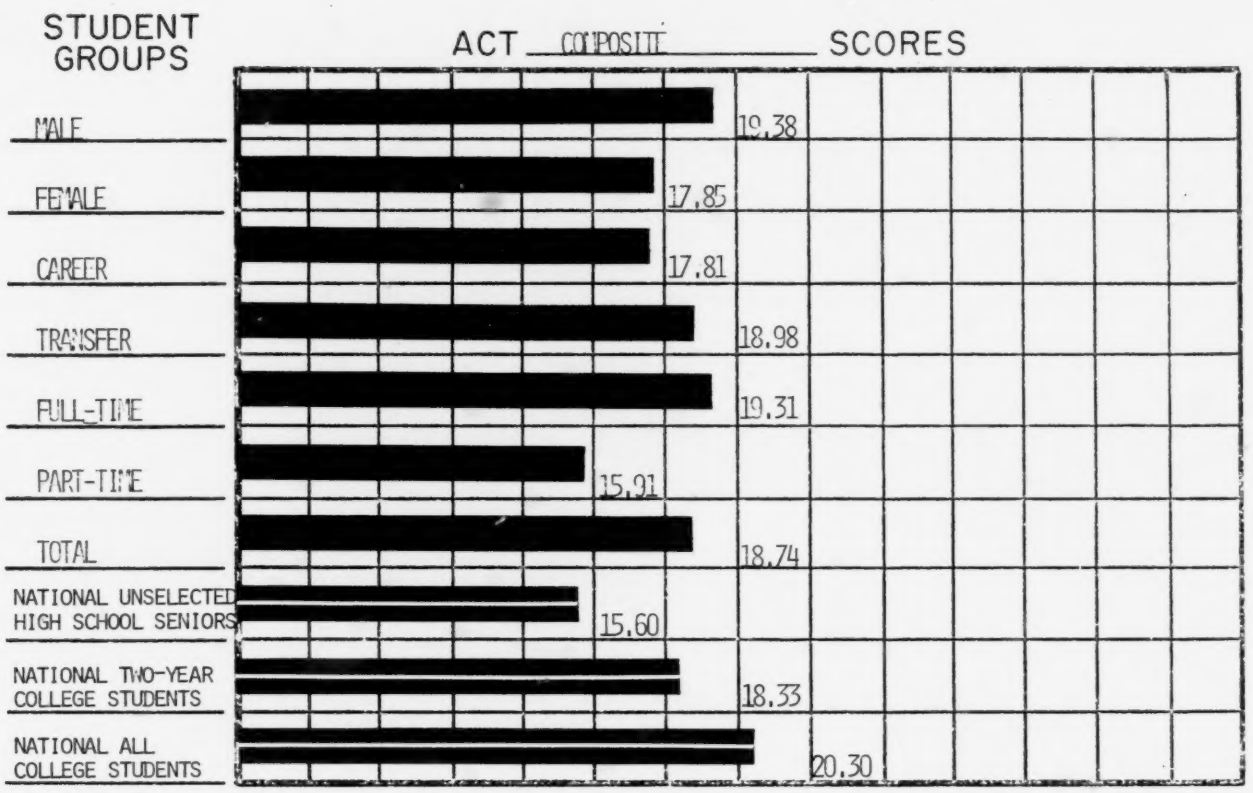
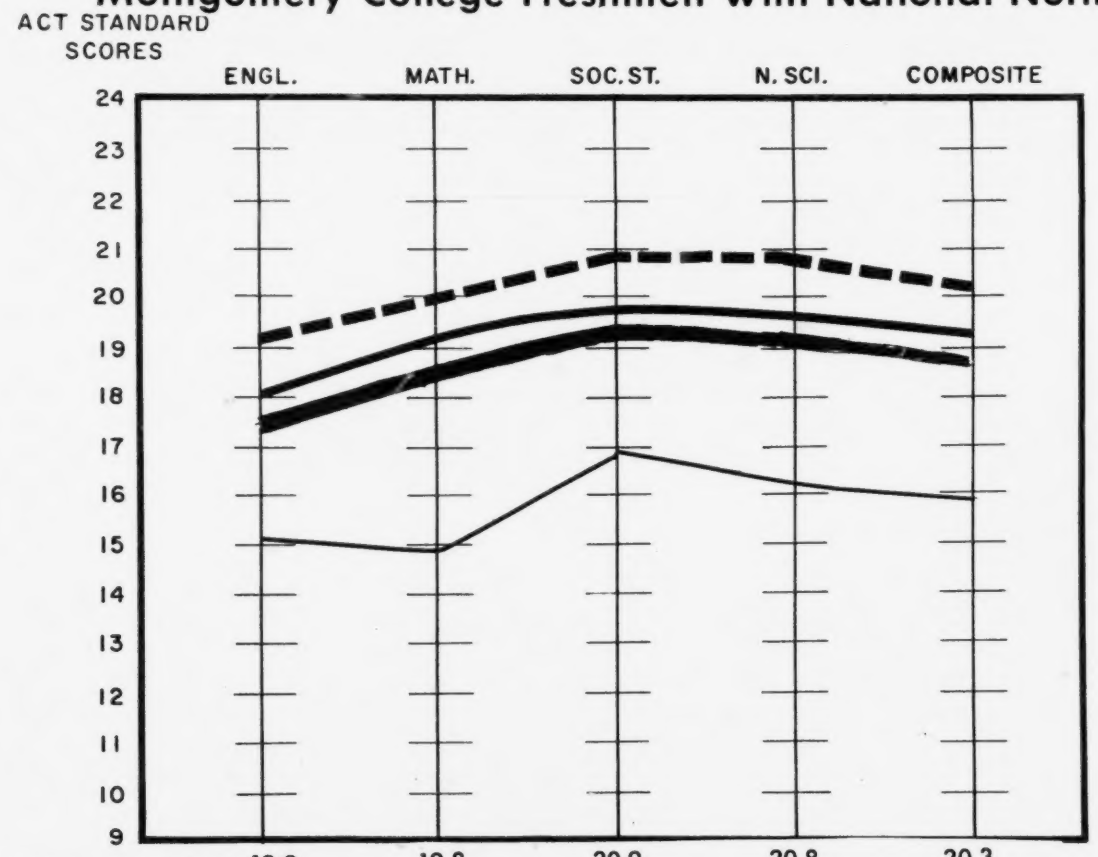


FIGURE 8

Comparison of Mean ACT Scores for Full-Time and Part-Time Montgomery College Freshmen with National Norms



	ENGL.	MATH.	SOC. ST.	N. SCI.	COMPOSITE
MEAN: NATIONAL	19.2	19.8	20.9	20.8	20.3
MEAN: TOTAL	17.6	18.5	19.3	19.1	18.7
MEAN: FULL-TIME	18.0	19.2	19.8	19.7	19.3
MEAN: PART-TIME	15.1	14.9	16.9	16.3	15.9

NATIONAL : TOTAL FULL-TIME PART-TIME

College Grades

English 101

Because English 101 is a required course for almost all first-semester freshmen, it was possible to obtain an average English grade for each of the subgroups (Figure 9). The female students as a group receive by far the highest English 101 grades. This corresponds with their higher ACT English score. The total freshman class has an average English score equal to the national all-college norm.[4] There is almost no difference between the average English grade received by career and transfer students.

Mathematics 112

Mathematics 112 is ordinarily considered a course for transfer-oriented students; therefore, the minimum number was not reached for any of the complete sets of subgroups. It is obvious from Figure 10 that students enrolled in Math 112 are mostly transfer-oriented, full-time males. The national norm in freshman mathematics for all college students is 2.0 or "C". The transfer students' average grade is 1.82, not significantly different from the norm. The average Math 112 grade at Montgomery College is slightly lower than the average freshman mathematics grade in two-year colleges.[5]

History 103

In the area of social studies, History 103 was selected for computing the College average. Again, no complete set of subgroups reached the minimum

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[4] Ibid., p. 205.

[5] Ibid., p. 201.

required for computing the average (Figure 11). History is one of the several options students have for fulfilling their social science requirements. It appears that transfer-oriented, full-time male students tend to select the history option. Freshmen at Montgomery College tend to receive lower history grades than do students nationally.

Biology 101

As in mathematics, it was found that Biology 101 is a course primarily for transfer-oriented students. Montgomery College students come very close to the national norm set by all college and university students across the country (Figure 12). Later it will be shown that the correlation between high school grades, ACT scores, and Biology 101 grades is the highest of any in this study.

Overall Grade Point Average

When individually selected courses are considered separately, the Montgomery freshman student tends to receive lower grades than does the average college and university freshman in the United States (Figure 14). However, the overall grade point average of the College's students is slightly higher than the national norm (Figure 13). Further study reveals that on the average female students earned higher grades than did the males. Career-oriented students in this study earned higher GPA's than their transfer-oriented classmates. As has been suggested earlier, the full-time students earned higher overall grades on the average than did part-time students.

FIGURE 9

Mean College Grades by Selected Groups of Students

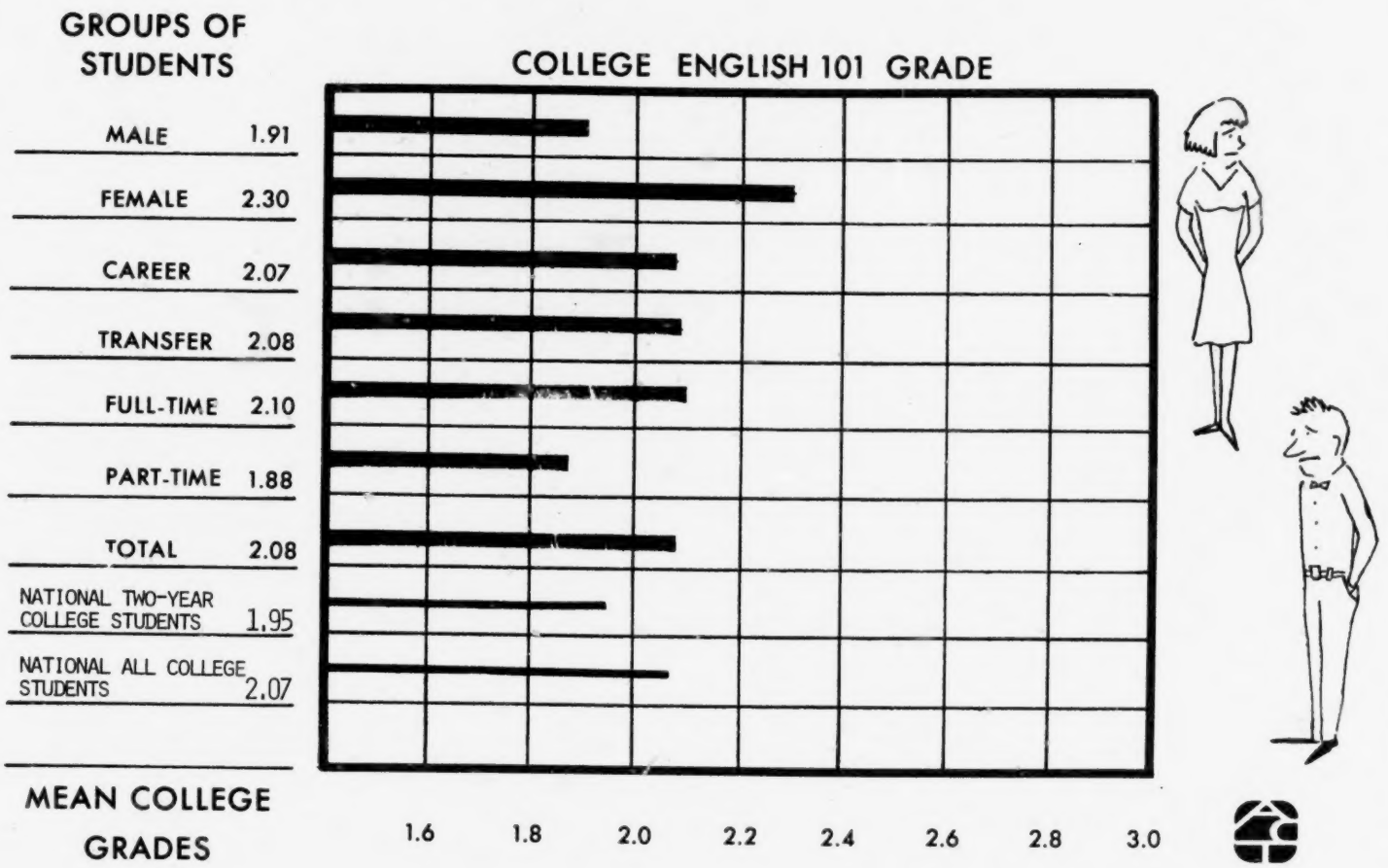


FIGURE 10

Mean College Grades by Selected Groups of Students

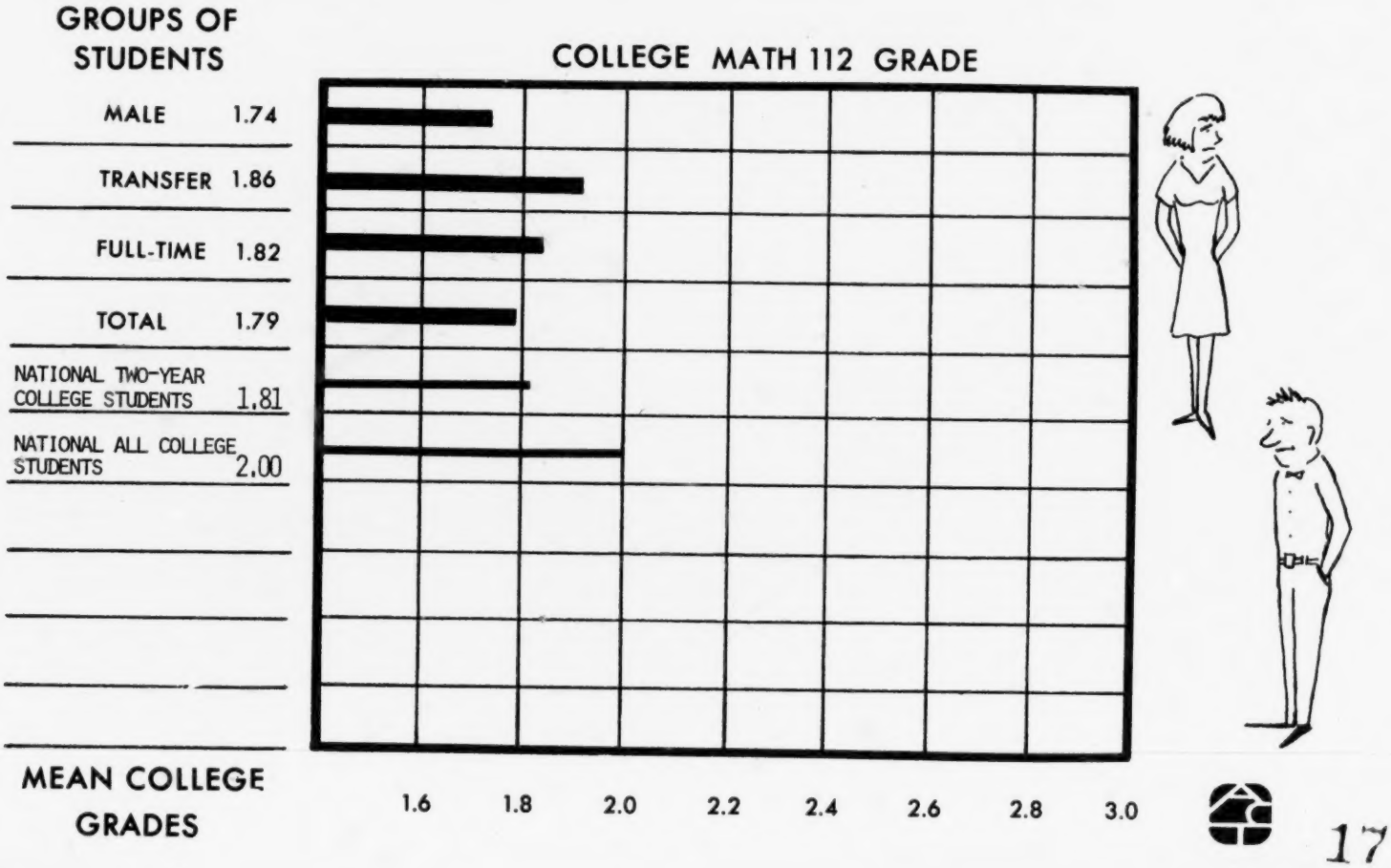


FIGURE 11

Mean College Grades by Selected Groups of Students

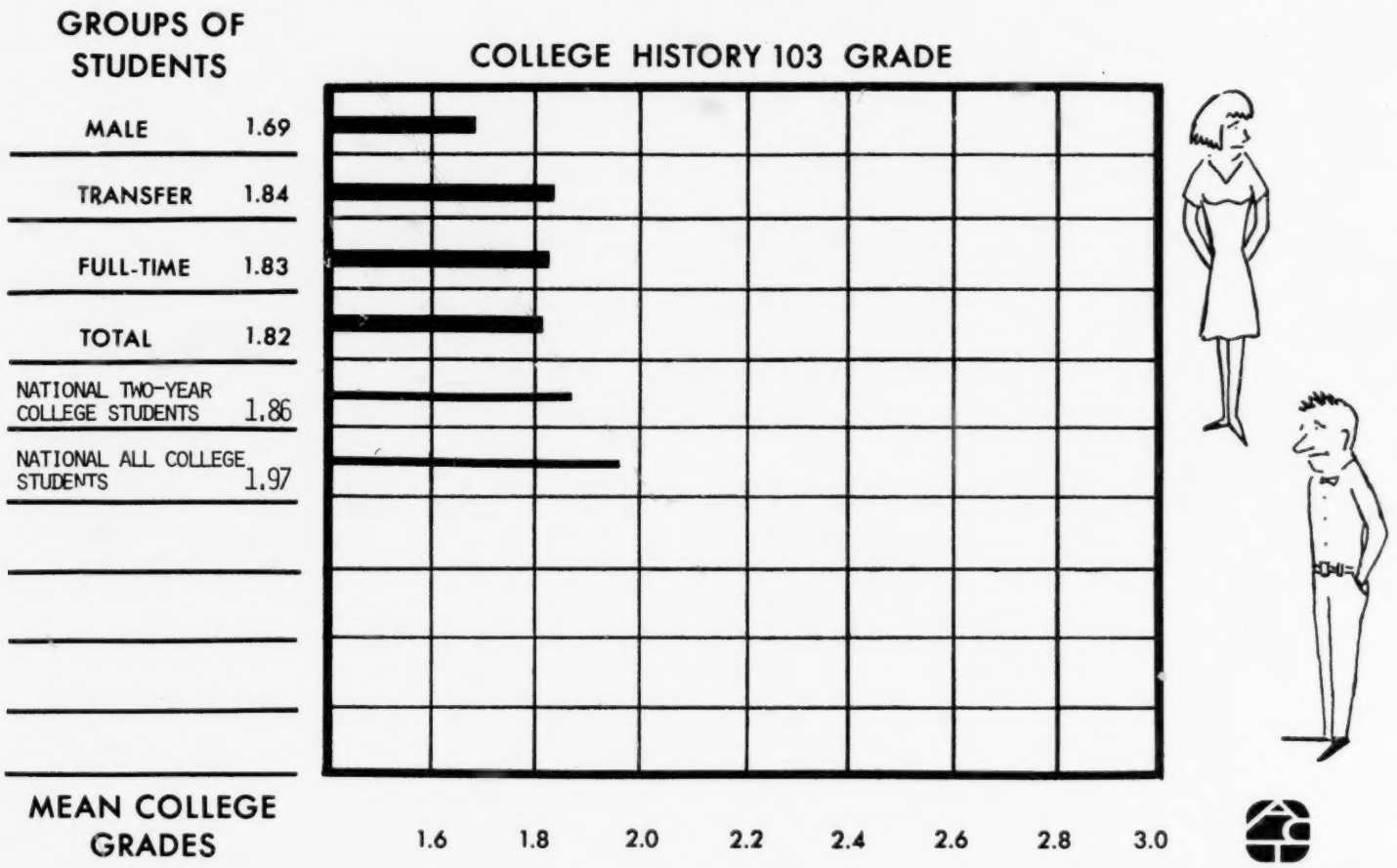


FIGURE 12

Mean College Grades by Selected Groups of Students

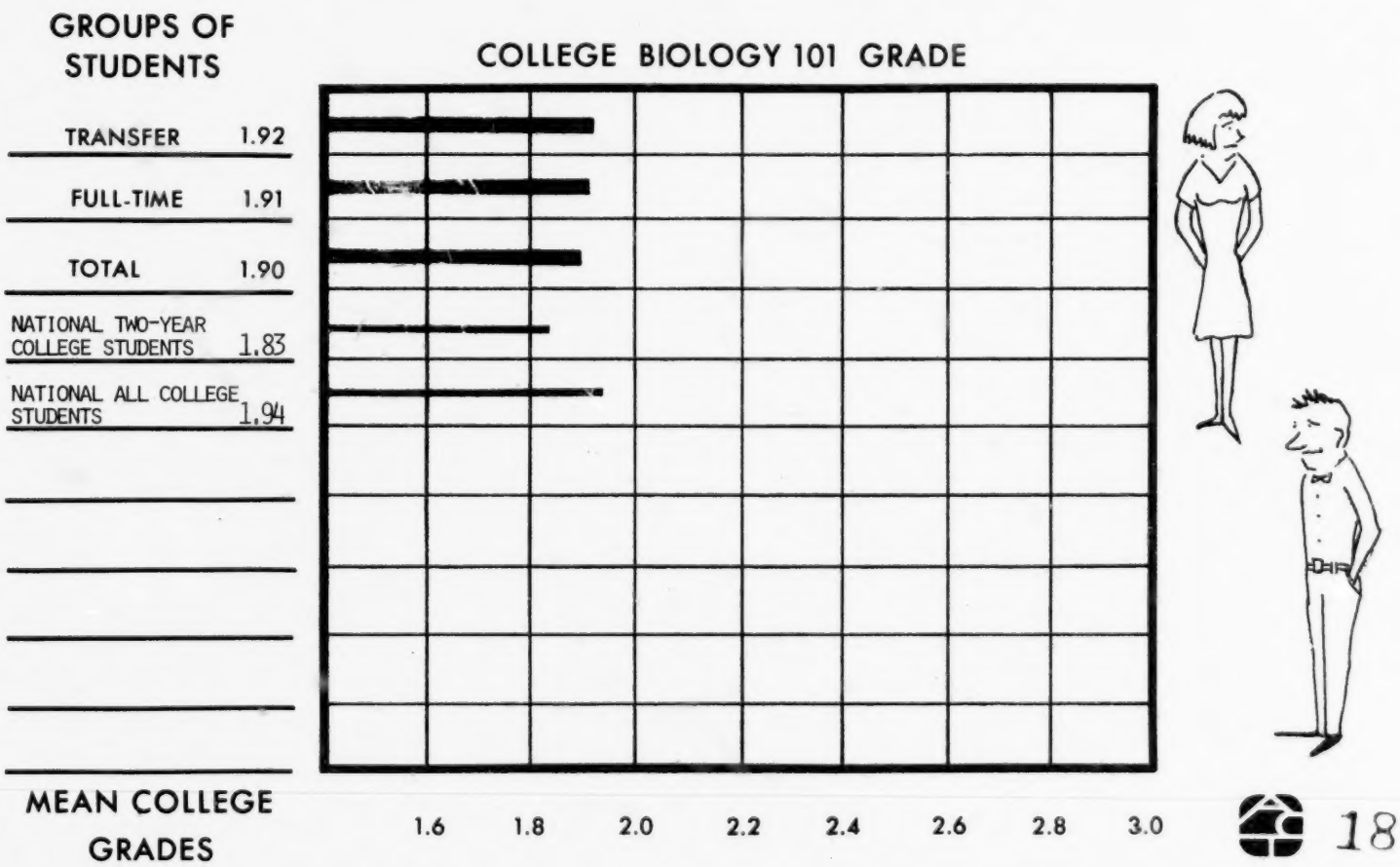


FIGURE 13

Mean College Grades by Selected Groups of Students

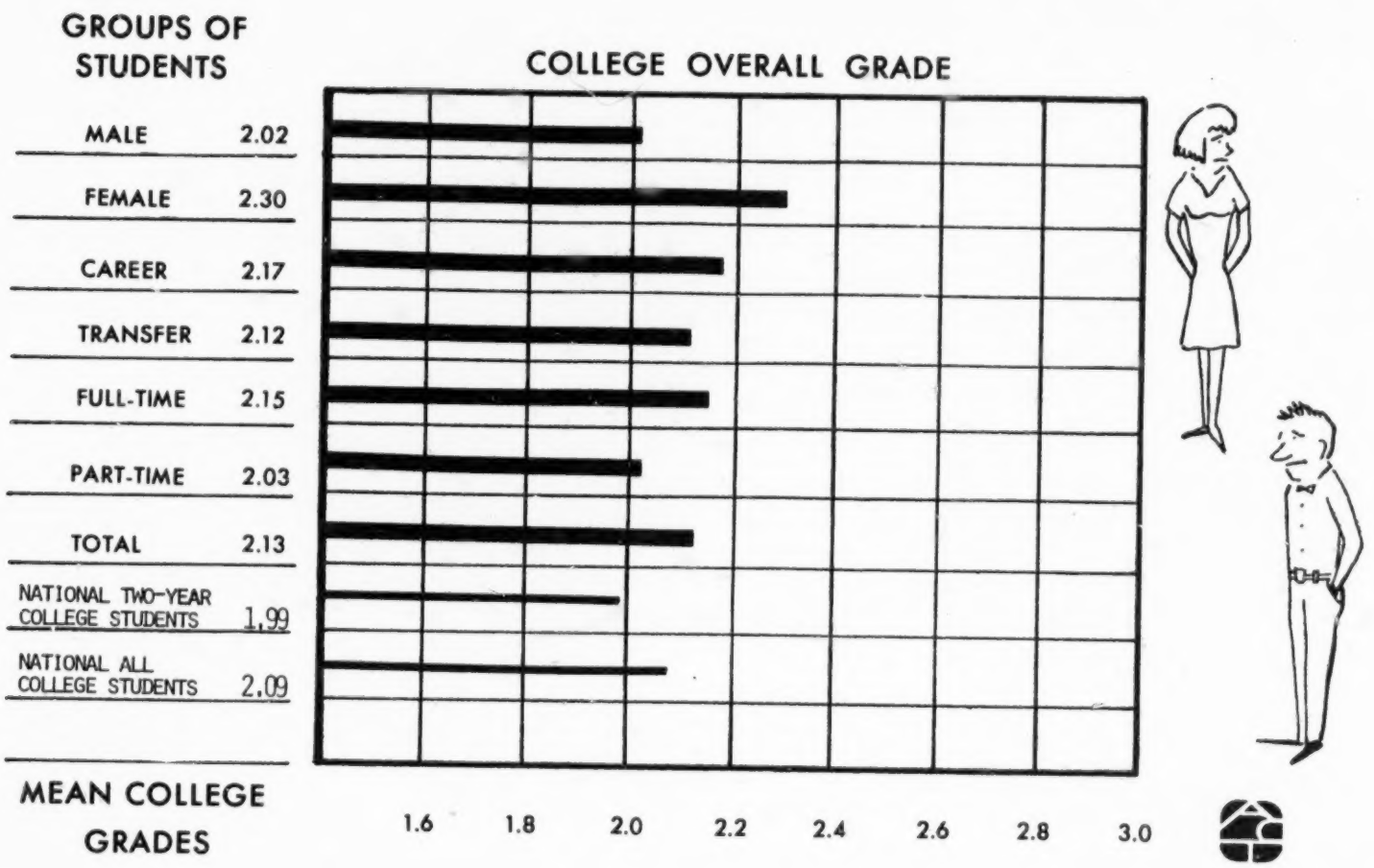
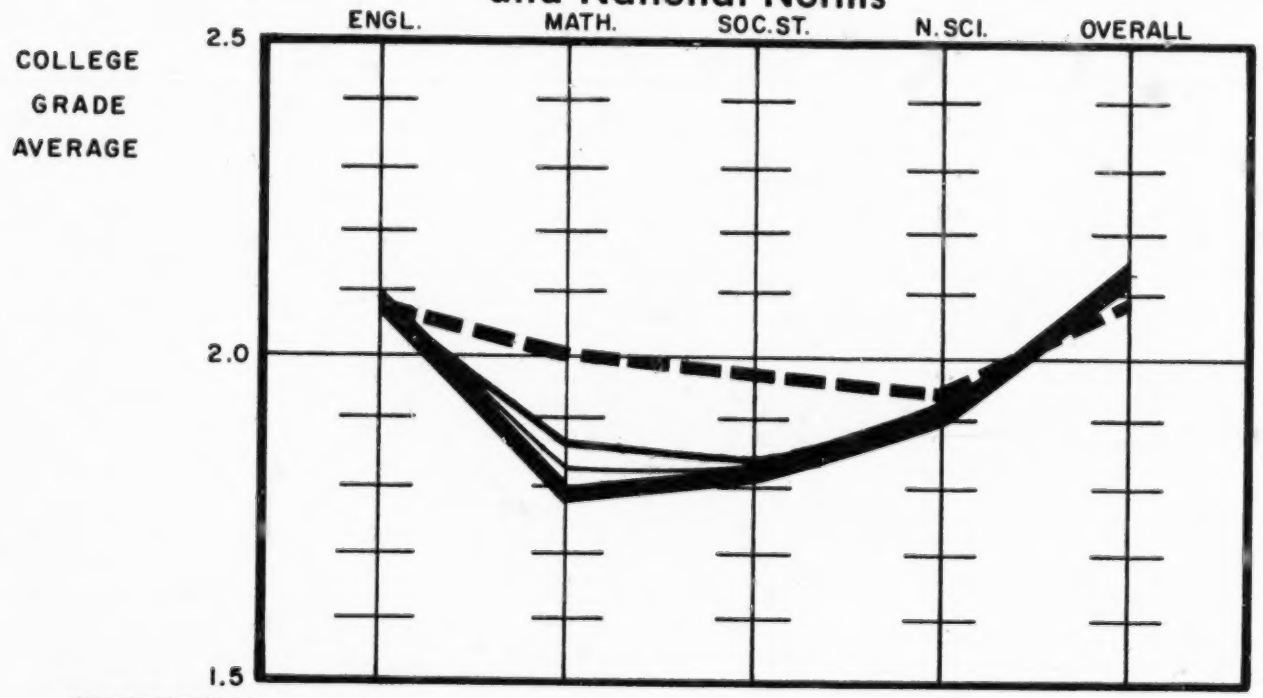


FIGURE 14

Comparison of the Mean College Grades for Transfer and Full-Time Montgomery College Freshmen with Total Freshman Class and National Norms



	ENGL.	MATH.	SOC.ST.	N.SCI.	OVERALL
MEAN:NATIONAL	2.07	2.00	1.97	1.94	2.09
MEAN:TOTAL	2.08	1.79	1.82	1.90	2.13
MEAN:TRANSFER	2.08	1.86	1.84	1.92	2.12
MEAN:FULL-TIME	2.10	1.82	1.83	1.91	2.15

NATIONAL — — — — TOTAL ▬▬ TRANSFER ——— FULL-TIME ———

ACT Scores, High School Grades, and College Averages

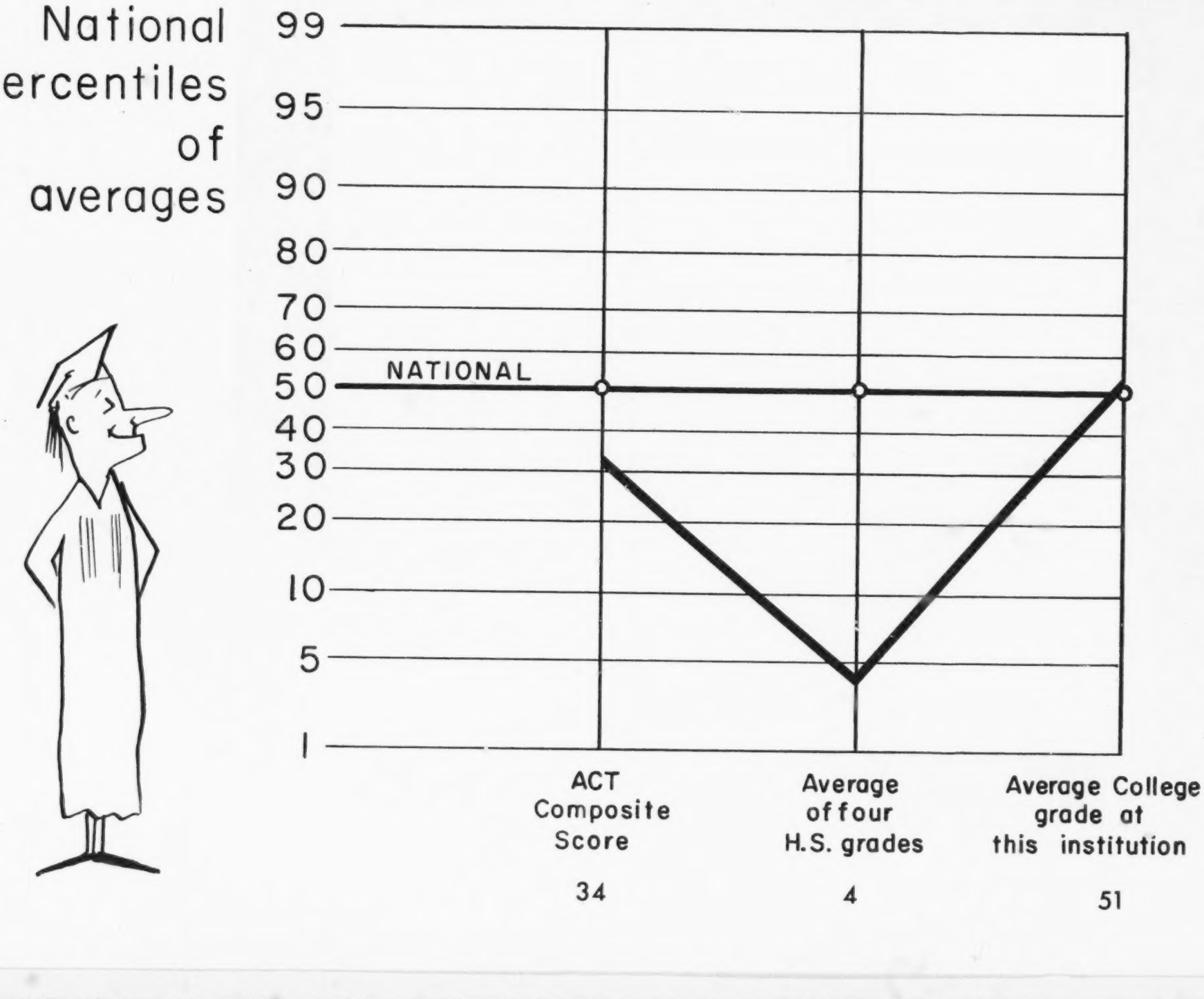
When the students who matriculated at Montgomery College in the fall of 1969 are compared to all college students, their average American College Test score reached the thirty-fourth percentile (Figure 15). Put another way, one can say that sixty-six percent of all college students across the nation score higher on ACT tests than do Montgomery College students.

As stated previously, students of a given level of ability are frequently graded lower in Montgomery County public high schools than in most school systems in the United States. Thus, the average of the four self-reported high school grades places the Montgomery College student at the fourth percentile when compared to the national norm (Figure 15).

Despite the fact that the average Montgomery student tends to score lower on standardized tests and generally receives lower high school grades than the average college student in this country, he does earn college grades on par with his counterpart. Local students rank at the fifty-first percentile (Figure 15).

FIGURE 15

Comparison of Montgomery College Averages of Scores and Grades with Averages at Other Colleges



Predicting College Grades

There are many good reasons for predicting probable levels of academic achievement. Counseling and placement requires this information; modification of instructional programs must be made with probable levels of outcome as one consideration. One of the most common practices is to use a combination of criteria such as test scores and high school grades. This practice suggests that a student's high school record is a good indication of how well he will do in college and that standardized tests measure the skills necessary for success in the various subjects studied at the college. In situations of high predictive accuracy, students who do well in high school and who do well on tests also receive high grades in college. Conversely, students with low high school grades and poor test scores earn low college grades. To the extent that these correlations exist, the predictions will be accurate.

Contrary to past trends, there is a growing interest among educators in finding ways to "beat the system". It is argued that the goal of the community college should be to provide opportunities for students to overcome deficiencies suggested by high school grades and test scores. The argument is well stated by Hendrix.[6]

> For comprehensive community colleges, there is no philosophical reason to expect or desire a high degree of predictability of grades and grade point average from ability measures. For example, if a high multiple correlation coefficient indicates a strong relationship between ACT scores and grade average, this could be interpreted to mean that grades are largely determined by the ability "in-puts" the students bring to the college. In other words, the "out-put" of the college is largely determined by the nature of the "in-put" and not by what

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[6]Vernon Hendrix, "The Prediction of Grade Point Average and Selected Course Grades from ACT Program Scores and Status as a High School Graduate," ERIC, ED 029 638, December, 1968, p. 3.

> happens to students after they enter the institution. If a weak relationship between ability measure and grade point average is indicated by a low correlation coefficient, this could be interpreted to mean that students of widely varying abilities are channeled into programs where success, as indicated by grades and grade point averages, is predetermined only to a small extent by their entering ability levels. This could mean the college is providing appropriate programs for students of different ability levels.

With this in mind, the predictive accuracy of the four college grades used in this study are presented. For each subgroup registering one hundred or more grades in a subject, a correlation coefficient was computed using ACT scores and high school grades. This is indicated as the "TH Index". For comparison national norms are presented for each course.

English 101

While the national norm for predicting freshman college English grades using high school grades and ACT English scores reaches a correlation coefficient of .568, at Montgomery College the index is .362 (Figure 16). Part-time students taken as a subgroup reach .432. Females and career students also have a higher index than do the other subgroups. Any index over .300 indicates a useful correlation; however, these relationships cannot be described as strong.

Mathematics 112

This study found that there is a stronger relationship between high school mathematics grades, test scores, and Math 112 grades at Montgomery than there is in the case of most of the other subjects. Nationally, these criteria produce a correlation coefficient of .525; here the total freshman class reached .479 (Figure 17). Transfer and full-time students were slightly higher.

History 103

A review of Figure 18 indicates that there is not a strong relationship between how well a Montgomery student does in social studies in high school, on ACT tests, and History 103. In other words, what a student learns in high school or answers on ACT skills tests does not always have too much to do with his college grade in History 103. This is not true on the average in colleges around the country.

Biology 101

Of the four courses included in the study, Biology 101 produced the highest TH Index (Figure 19). This course is taken primarily by full-time transfer students. As opposed to History 103, it appears that the skills a student brings from high school are related to his academic success in introductory college biology. Likewise, the skills and learnings measured by standardized natural science tests are closely related to those necessary for achievement in biology.

Overall Grade Point Average

When the predictor indices are correlated with the students' first semester overall grade point average, female and career students reach the highest TH Index (Figure 20). As high as these are, .49, they fall short of the national norm of .60.

The correlation coefficient is used to compare the predictive efficiency of the test scores with high school grades. Figure 21 indicates that there is a difference between the correlation coefficient of the two criteria. In all courses except natural science (Biology 101), the ACT score is a better predictor of college success at Montgomery than are high school

grades. This is not the case nationally. When the two criteria are combined, their efficiency is increased considerably.

Of the five coefficients computed, only mathematics and natural science reached the 25th percentile nationally. This means that less than twenty-five percent of the colleges in this study have predictive efficiency as low as Montgomery College.

In general it can be said that while what a student did in high school and how well he performs on standardized tests tend to indicate how well he will perform in college, this relationship is not as strong at Montgomery College as it is at most schools included in the study. In other words, there are unidentified factors which tend to operate contrary to these criteria. To the extent that these factors reflect the College's success in overcoming past deficiencies of students, it is possible to conclude that "output" is not completely determined by "input" in the community college.

FIGURE 16

Predictive Accuracy of College Grades for Selected Groups of Students

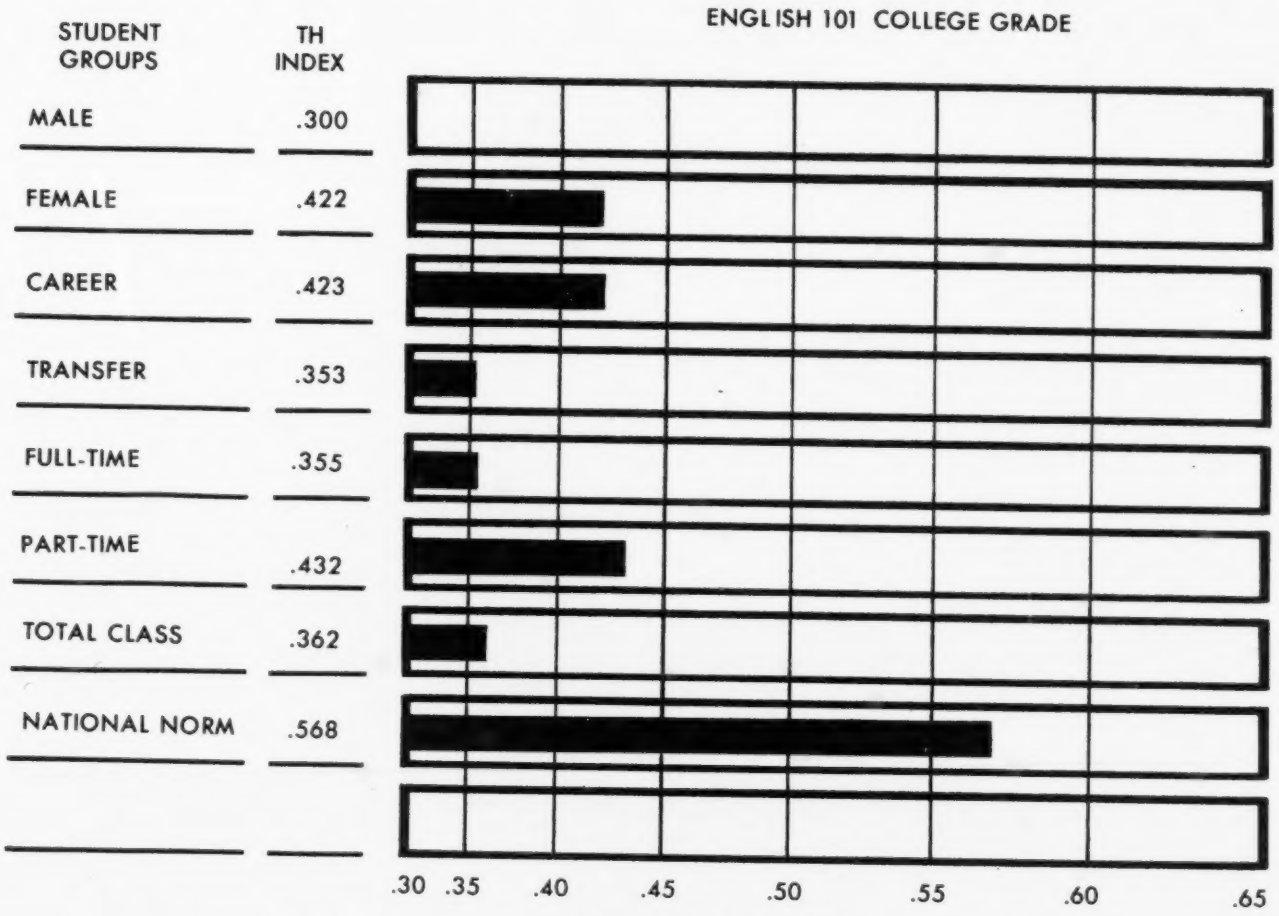

FIGURE 17

Predictive Accuracy of College Grades for Selected Groups of Students

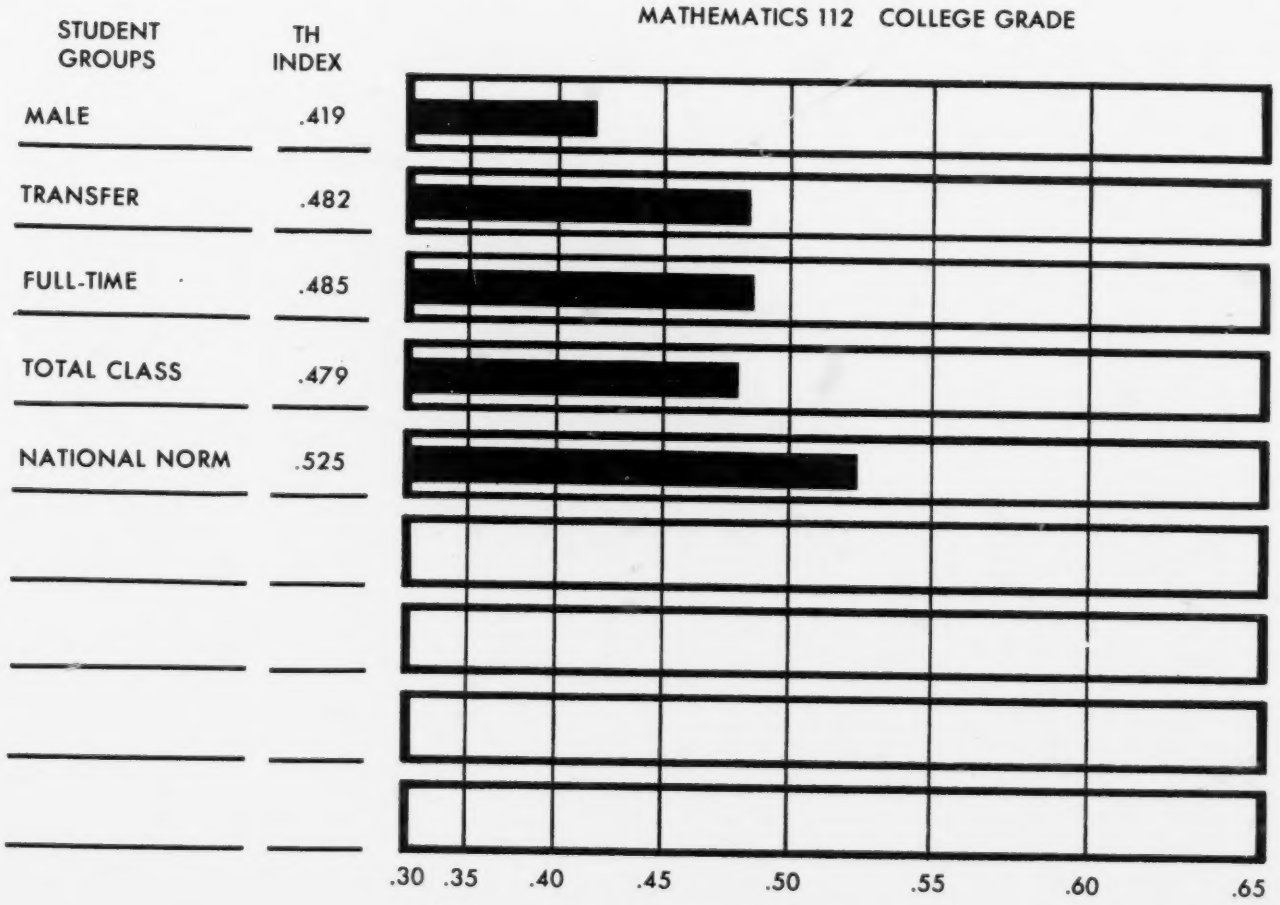

FIGURE 18

Predictive Accuracy of College Grades for Selected Groups of Students

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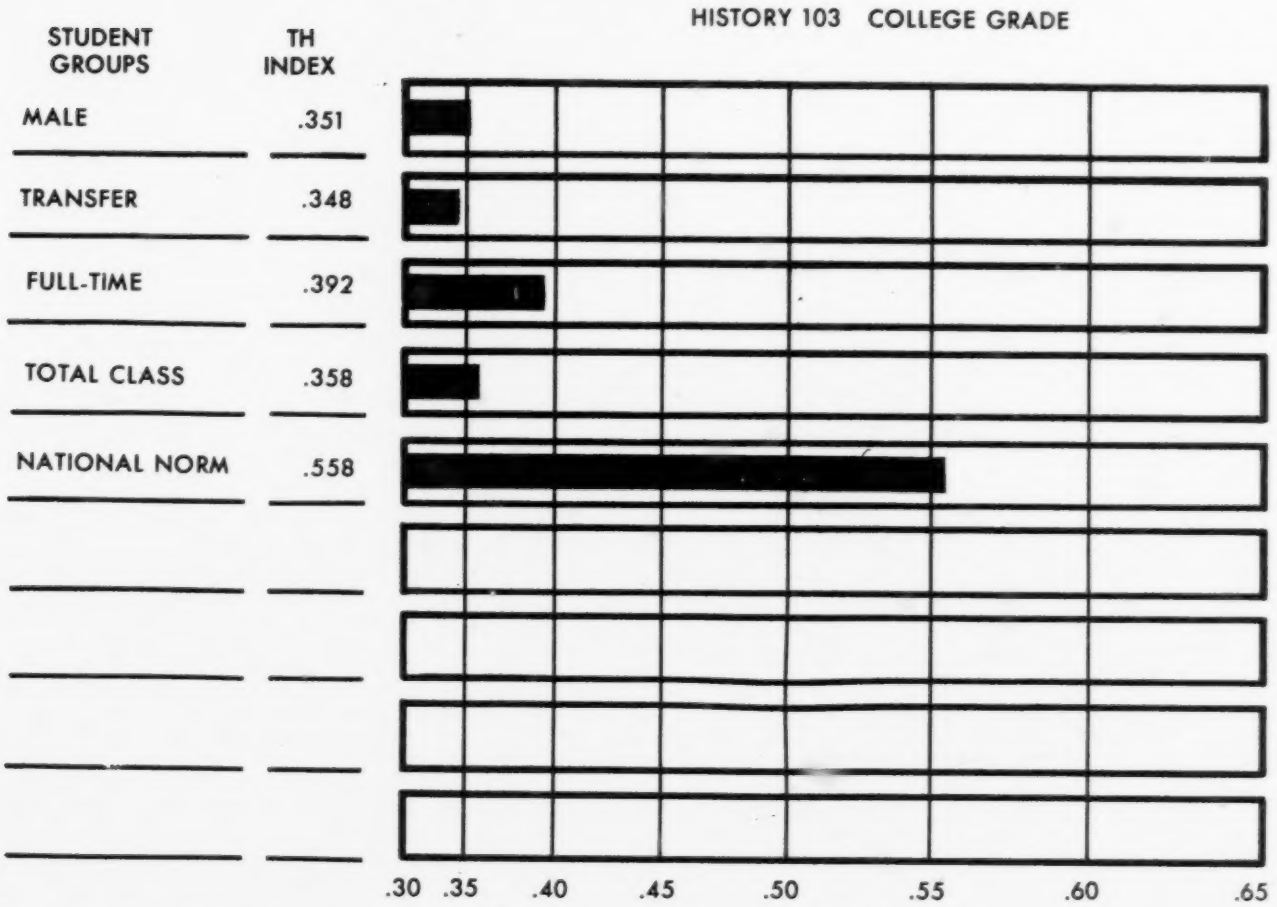

FIGURE 19

Predictive Accuracy of College Grades for Selected Groups of Students

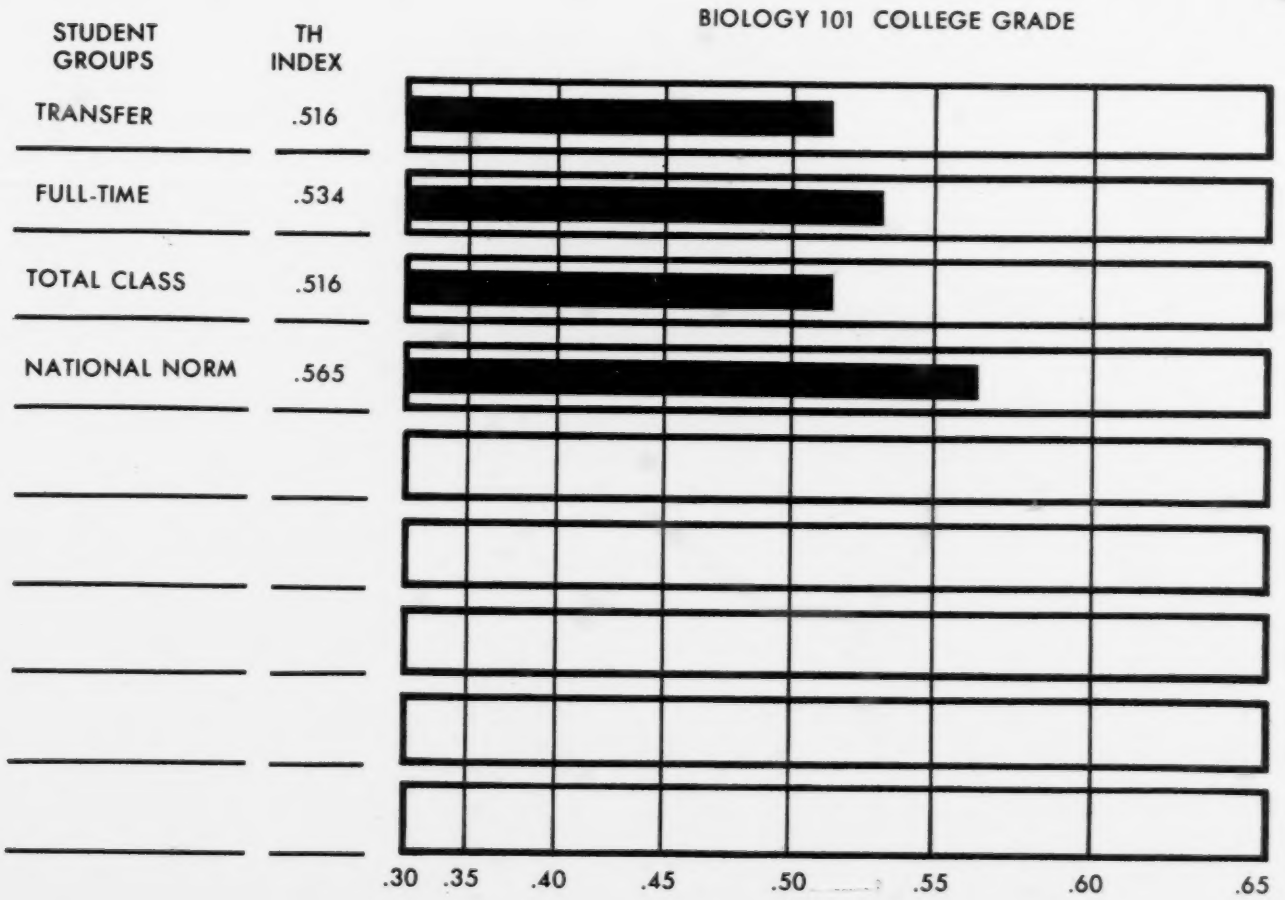

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FIGURE 20

Predictive Accuracy of College Grades for Selected Groups of Students

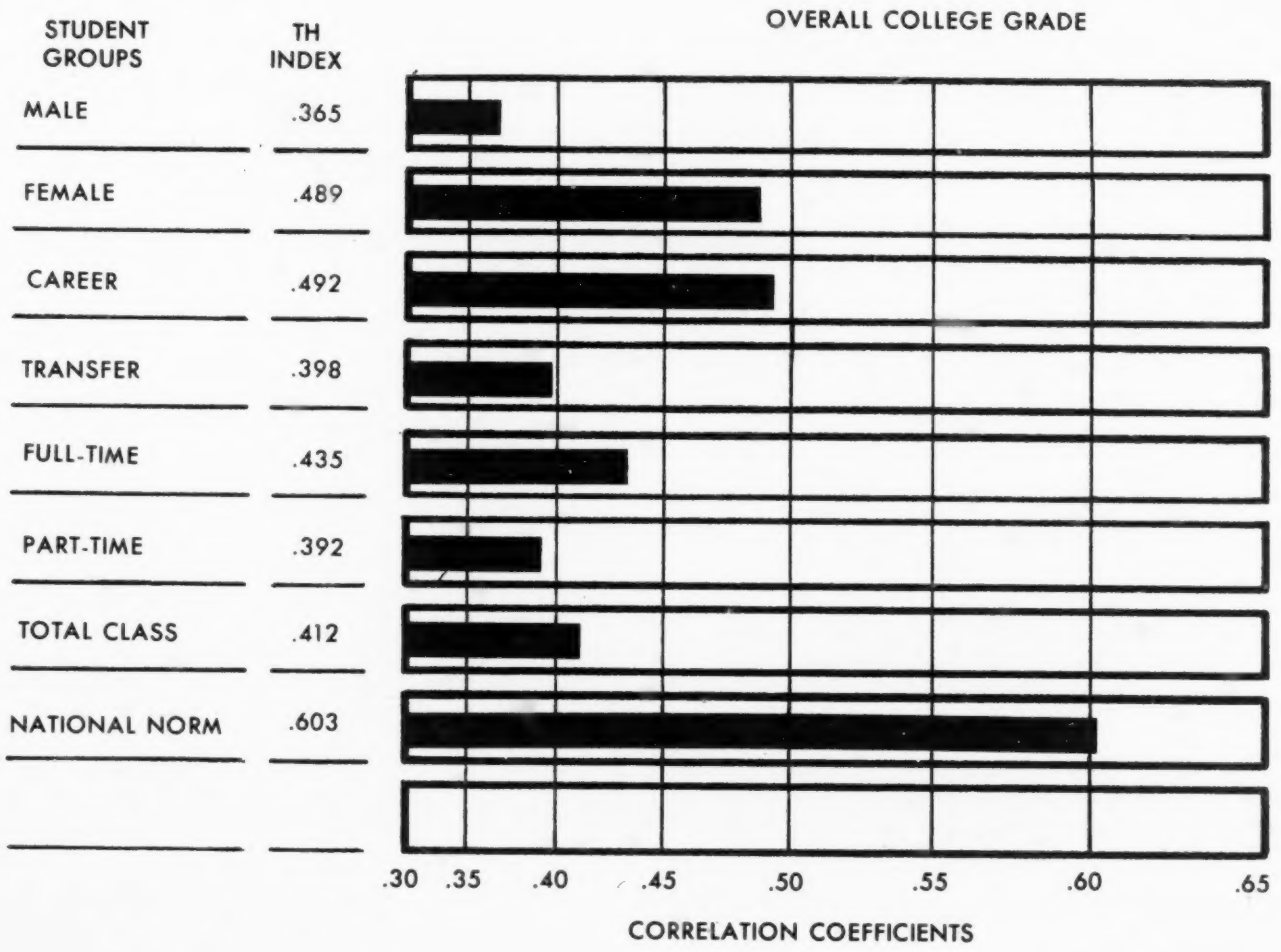
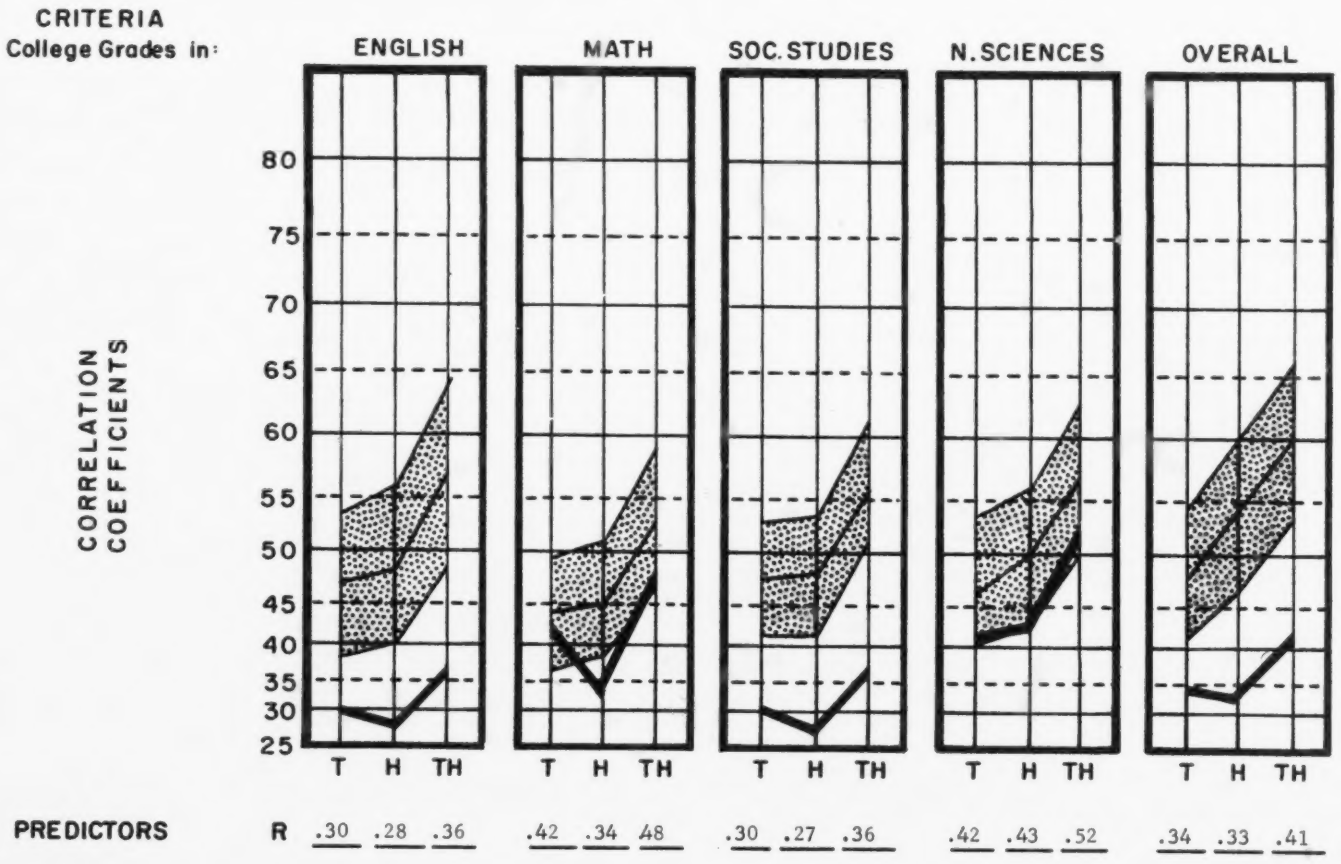


FIGURE 21

Relative Efficiency for ACT Predictors of College Grades



(SHADED AREAS INDICATE THE NATIONAL 25th, 50th, & 75th PERCENTILES)

Trend Analysis

This is not the first year the College has compared high school grades and ACT scores with academic achievement. Montgomery College has participated in the Basic and Standard Research Services of ACT each year since 1963 with the exceptions of 1965 and 1969.

Following is a comparison of six studies and the changes which have occurred since 1963. There is no way to make certain that the same criteria were used in identifying the sample used each year and different freshmen courses were used for college grades; however, the fact that an unmistakable trend does exist makes this analysis useful.

Changes have taken place over the past eight years in the scores of incoming students. With respect to ACT scores and high school grades the trend is mixed.

Looking at the average of the four high school grades (Table I), it appears that the 1970 student has slightly higher high school grades than the 1963 student. The freshmen are less variable in their grades as can be seen from the standard deviation of the high school average. A difference in grade distribution this large would occur by chance less than one time in a hundred.

Examining the ACT subtest scores the opposite seems to be taking place (Table II). The 1970 freshmen have lower average scores and a wider distribution.* Part of this change is due to the increased size of the group taking the test, up from 692 students in 1963 to 1379 students in 1970. Another part of the explanation must be that the College's expanding educational

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*This great a change could also be expected to occur by chance less than one time in a hundred.

program is attracting a larger segment of the community including many whose motivation and level of skills is significantly different from the earlier years of the College's existence.

The changes are apparently generalized and not reflected in any specific subject area.

The ability of ACT scores to estimate College grades remains acceptable (Table III). The standard error of estimate, the band which includes over two-thirds of all cases, has increased in precision slightly. It is now a little over half a letter grade on the 4-point grading scale.

Although criterion referenced grading is a long way from being a reality at Montgomery College, the trend is in the right direction. The extent to which the College grades coincide with demonstrated skills in the four ACT subtest areas overall is up from 14 percent in 1963 to 17 percent in 1970. The national norm is 23 percent.

Table I

TREND ANALYSIS -- HIGH SCHOOL GRADES -- INCOMING FRESHMAN CLASS

		1963	1964	1966	1967	1968	1970
ENGLISH	Average	1.90	2.09	not available			2.16
	Std. Deviation	0.76	N/A	"	"		0.70
MATH	Average	1.70	2.04	"	"		1.86
	Std. Deviation	0.87	N/A	"	"		0.80
SOCIAL SCI.	Average	2.00	2.02	"	"		2.21
	Std. Deviation	0.83	N/A	"	"		0.80
NATURAL SCI.	Average	1.80	1.89	"	"		1.97
	Std. Deviation	0.81	N/A	"	"		0.78
Average of Four Grades	Average	1.90	2.01	1.95	1.94	2.01	2.05
	Std. Deviation	0.76	N/A	0.57	0.58	0.58	0.53

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Table II

TREND ANALYSIS -- ACT AREA TESTS

		1963	1964	1966	1967	1968	1970
ENGLISH	Average	20.10	18.80	18.24	18.62	18.33	17.55
	Std. Deviation	3.06	N/A	4.25	4.26	4.28	4.62
MATH	Average	19.50	19.80	19.42	19.14	18.46	18.45
	Std. Deviation	5.42	N/A	5.54	5.64	5.81	6.00
SOCIAL SCI.	Average	21.00	20.70	21.40	21.19	20.20	19.30
	Std. Deviation	4.88	N/A	5.05	5.25	5.43	6.20
NATURAL SCI.	Average	20.70	20.60	20.67	20.97	20.35	19.09
	Std. Deviation	5.07	N/A	5.30	5.35	5.34	6.10
COMPOSITE	Average	20.50	20.10	20.06	20.11	19.46	18.74
	Std. Deviation	3.55	N/A	3.90	3.97	4.05	4.64

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Table III

EFFICIENCY OF ACT SCORES AS ESTIMATORS OF COLLEGE GRADES OVER THE YEARS -- 1963 TO 1970

	1963	1964	1966	1967	1968	1970
Standard error of estimate	±0.71	not available	±0.80	±0.80	±0.77	±0.70
Correlation of four ACT Subtests and High School Grades with G.P.A. at Montgomery College	.37	.40	.36	.40	.41	.41
% measurements in common of ACT subtests (including high school grades) with G.P.A. at Montgomery	14%	16%	13%	16%	17%	17%
Number of Students in Study	692	539	1149	1213	1174	1379

DISCUSSION

Implications for the System of Grading

A relationship is inferred between grades earned in high school, grades earned in college and basic academic skills. American College Test scores are specific indicators of skills with variables of personality interaction, test conditions, etc. as carefully controlled as possible. Skill tests do not measure application or interaction of skills. Grade point average implies a measure of these skills to some extent. Grade point average also reflects simultaneously other factors which enter into any individual subjective judgment.

Prediction results from correlation. If two tests measured exactly the same skills with complete accuracy, a perfect prediction of the score on one test would be possible by knowing the score on the other test. This never happens because no test or other measuring device is completely accurate. There is error of measurement and this prevents perfect prediction. Predicting a multi-variate measure such as grades from a knowledge of a single variable or skill is never very accurate. The larger the number of contributing variables which are known, the more accurate the prediction can be of the multi-variate measure; however, because of measurement error, the prediction will never be completely accurate.

This relationship can be graphically illustrated as follows:

ACT Test Score = [Skills Factor] + [Measurement Error]

G.P.A. = [Skills Factor] + [Academic Load Factor] + [Personality Factors] + [Background Factors] + [Measurement Error]

Skills Factor: Correlation

Academic Load Factor + Personality Factors + Background Factors + Measurement Error: Error of Estimate

Thus, in effect, the measure of correlation is a measure of the overlap of two or more measuring instruments.

The composition of a course grade is the sum of a series of variables. The number and the value (or weight) assigned to these variables is different for each department and for each instructor. The use of ACT scores allows the college to identify one portion of the grade point average - the portion which is accounted for by basic educational skills.

It would be to the disadvantage of the student to base his grade entirely on the basic skills measured by ACT. It would be equally disadvantageous to the student and of questionable validity for the institution to ignore entirely the contribution of these basic skills in the institution's grading policy.

The composite ACT scores overlap college GPA by 23 percent nationwide. Nationwide high school GPA overlaps college GPA by 29 percent. A combination of the two measures overlaps college GPA by 36 percent. Thus, it seems reasonable that grading policy of the institution should accept a contribution of approximately 30 percent by basic skills to college GPA.

Basic skills as measured by ACT account for (overlap) only 11 percent of the student's overall GPA at Montgomery College. High school grades measure in common only 11 percent of the variables which contribute to GPA at Montgomery College. They do not necessarily measure the same 11 percent. In fact, both measures taken together account for variables which contribute 17 percent of the college GPA.

Table IV is a display of the correlations between Montgomery College GPA and ACT scores which are unusually low. There are a number of possible inferences about the grading standards of the areas indicated by these statistics.

1. Instructors teaching different sections may have different objectives and grading standards and thus would grade similar-ability students differently.

2. Many instructors may be basing grades primarily on factors not related to academic ability (persistence, effort exhibited, personality, good looks, likability, class participation, or rote memorization).

3. Many instructors may be stressing content mastery (recognition, recall, memorization) rather than more general academic goals (ability to generalize, draw inferences, or reason).[7]

4. Students may have quit class without informing the College because of work, personal problems, or discouragement. The policy of the College is to give an F unless the student officially withdraws. Some of these students may be very bright. Some colleges studying their grading practices and policy have discovered this to be the main reason for low correlations between basic skills measures and grades.

Persons responsible for instruction in subjects where low correlation with basic skills is observed might profitably undertake an examination of course objectives and grading policy. A sharing of opinion and current practices within a department may or may not result in more uniform and reliable grading practices but should at least result in a clearer and more definitive policy on assigning grades which justifies the apparent lack of consideration given to basic skills or identifies a unique problem of college policy which is affecting the grading system.

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[7]American College Testing Program Standard Research Report interpretive notes.

If academically significant but non-intellectual* factors are a primary consideration (persistence, neatness of written work, punctuality) in Montgomery College's grading practice and if the majority of freshmen have not changed in this regard, there should be a higher correlation between college GPA and high school GPA. This proves not to be the case. Correlation between high school subject grades and subject grades in English 101 and History 103 are low. Table V shows the breakdown of subjects and subgroups where the correlation is less than .30. This is further indication that examination of the grading patterns in these areas would be profitable. One possible explanation which could emerge from such an examination is that a large number of students are so involved in dating and other extracurricular activities that they are motivated only to "get by" gradewise. Such students possibly could profit from counseling in the use of their independence from parental control.

Use of High School Grades for Placement

The degree to which high school grades and the ACT subtests are measuring the same thing (their commonality) indicates their value as separate predictors of college success. If each measures the same thing, then there is no advantage in using both measures. The smaller the commonality between ACT scores and high school grades, the greater the potential value of each score as a separate predictor of success.

Academic success is predicted more accurately for the career student than for the transfer student. The index of combined ACT scores and high

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*ACT Composite correlates highly with intelligence measures, e.g. R = .77 with the Otis I.Q. test.

school grades for the career student is .423 which is higher than for any other group. The correlation of high school grades with college GPA is higher for the career students than is the correlation of the ACT scores and GPA. The greater predicting efficiency of high school grades for the career student is also observed in English 101. The reverse is true for the transfer student.

Thus, a counselor advising a new student whose high school grades and ACT scores give a divergent picture of his abilities could give more accurate council by weighting in his judgment high school grades more heavily for the career-oriented student and ACT test scores more heavily for the transfer student.

For part-time students neither ACT test scores nor high school grades have a consistent relationship to college grades at Montgomery. In fact, high school grades do not correlate well with ACT scores. Thus, for part-time students there appears to be no accurate means of predicting academic success.

The relative efficiency of high school grades as predictors of college grades is low in comparison to national medians for relative efficiency obtained from 1965, 1966, and 1967 ACT research services surveys. Table VI gives these comparisons. The majority of our freshmen enrollment comes from the Montgomery County public school system. County high schools appear to be similar to each other in programs and grading practices. Montgomery County is also noted for a relatively homogenious population, largely affluent and largely well educated. With this set of circumstances, one would expect fairly high correlation of high school with college grades. That this is not

the case may be a reflection of the grading patterns prevalent in the county system. Consistently low grading of county high school students with high academic ability would produce low levels of agreement.

Table VII-A shows the average grades of students enrolled in four freshmen courses at Montgomery College. Table VII-B indicates the standing of these grades relative to the English, Math, Social Studies, and Natural Science grades of all two-year colleges nationally for the years 1965, 1966, and 1967. The unusually low percentile ranks of the average high school grades, predominantly (90+%) of Montgomery County indicate how unusually strict is the grading policy of the county. Students whose ability of ACT skills test would have resulted in considerably higher grades had they gone to most other county high school systems are represented as low-ability students on the basis of Montgomery County high school grades.

In comparison with two-year schools nationally, Montgomery College's grading pattern for the four listed courses appears quite normal with the single exception of Math. A difference of 30 percentile points between college GPA and ACT composite scores is considered important. The math ACT composite percentile (70) exceeds the college math GPA percentile (22) by more than thirty. This indicates unusual strictness in the grading of math students relative to the other two-year colleges. This may be more a reflection on the composition of the math courses in the comparison group. Math 112 is transfer-student oriented. The math grades reported by the other two-year institutions may include a selection of math courses which are remedial or are less rigorous in scope. The math department might be interested in investigating the levels of performance for comparable math courses in some neighboring schools.

Table IV

PERCENT OF MEASURED SKILLS COMMON TO ACT SUBTESTS AND SUBJECT AREA GPA AT MONTGOMERY COLLEGE

Subject Area College GPA	Correlation Coefficient	% of Common Variance	Standard Error of Estimate	No. of Students
College-wide English 101	0.296	9%	1.009*	1281
Male Students College-wide En 101	0.247	6%	1.015*	741
Male Students College-wide Hs 103	0.294	9%	1.089*	177
Transfer Students -- En 101	0.298	9%	1.008*	1024
Transfer Students -- Hs 103	0.286	8%	1.114+	251
Full-Time Students -- En 101	0.283	8%	1.006*	1126
Part-Time Students Overall GPA	0.249	6%	0.489**	230

*Standard error equals one letter grade in this case
**Standard error equals less than one letter grade
+Standard error exceeds one letter grade

Table V

DEGREE OF RELATIONSHIP BETWEEN HIGH SCHOOL GRADES AND SELECTED SUBJECT AREA GRADES AT MONTGOMERY COLLEGE

Subject Area	Correlation Coefficient	% of Common Variance	Standard Error of Estimate	Number of Students
College-wide English 101	0.282	8%	1.014	1281
College-wide History 103	0.274	7%	1.124	257
All Male Students				
English 101	0.220	5%	1.022	741
Math 112	0.282	8%	1.207	144
History 103	0.248	6%	1.104	177
Overall	0.256	6%	0.740	805
Full-Time Students				
English 101	0.288	8%	1.005	1126
Part-Time Students				
English 101	0.295	9%	1.058	155

Table VI

COMPARISON OF EFFICIENCY OF HIGH SCHOOL GRADES FOR PREDICTING GPA AT MONTGOMERY COLLEGE AND NATIONALLY FOR TWO-YEAR COLLEGES

Montgomery College Subject	Correlation Coefficient	Percent of Common Variance	Standard Error of Estimate*	Freshman College Subject	Correlation Coefficient	Percent of Common Variance	Standard Error of Estimate*
English 101	.282	8%	1.014	English	.485	23%	0.791
Mathematics 112	.336	11%	1.208	Math	.453	20%	1.027
History 103	.274	7%	1.124	Soc. Stu.	.477	23%	0.865
Biology 101	.433	19%	1.108	Nat. Sci.	.494	24%	0.910
Overall GPA	.329	11%	0.724**	Overall GPA	.541	29%	0.647

*Standard Error of 1.0 or greater make prediction for individual students unreliable.

**Standard Error for overall GPA of 0.70 or greater make prediction for individual students unreliable.

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Table VII-A

GRADE POINT & ACT COMPOSITE AVERAGES FOR FOUR FRESHMAN COLLEGE SUBJECTS

Montgomery College Students Enrolled In...	ACT Composite	Average of 4 H-S Grades	MC GPA*	Number of Students
English 101	19.0	2.06	2.08	1281
Math 112	21.1	2.14	1.79	185
History 103	20.4	2.13	1.82	257
Biology 101	18.2	2.05	1.90	105
Overall	18.7	2.05	2.13	1379

Table VII-B

PERCENTILE RANK OF AVERAGE GRADES NATIONALLY FOR TWO-YEAR COLLEGES

Montgomery College Students Enrolled In...	ACT Composite	Average of 4 H-S Grades	MC GPA*	Number of Students
English 101	38	4	53	1281
Math 112	70	6	22	185
History 103	60	6	25	257
Biology 101	26	4	38	105
Overall	34	4	51	1379

*Refers to English GPA in English area, Math GPA in Math area, etc.

Internal Criteria of Grades

Usually measures of academic ability are positively related to all other measures. This is because all such measures are language and literacy oriented. Such tests require the ability to read and to some extent write. Some measures of related areas depart from expectation. Table VIII-A shows the correlation and percent of commonality between the ACT subtests and the related freshman course at Montgomery College. Table VIII-B shows the highest observed correlation of the course with a subtest. It should be noted that colleg-wide, History 103 grades have 9 percent of the basis of grades in common with the English skills test and 4 percent in common with the social studies skills test, a bias of 5 percent in favor of the student whose English fluency is greater than his understanding of the social studies skills which the subtest measures.

Math 112 correlates with math skills better than any other subject with its respective subtest. The percentage of overlap between math basic skills and math grades in 112 is more than double that of English. The Biology 101 course correlates fairly well with the natural science skills subtest, but the composite score has one percent greater commonality. Either score would predict student performance with the same degree of accuracy. A similar situation exists with overall GPA. Either the composite ACT score or the English subtest score will predict overall GPA with equal accuracy. Interestingly, the contribution of English skills to a student's overall grade point average is 10 percent but only 8 percent to his grade in English 101. The criterion used for assigning grades in English 101 is thus highly suspect in terms of the consistency with which it is applied and its relationship to basic English skills as measured by ACT.

Table VIII-A

CORRELATIONS OF ACT SCORES WITH COURSE GRADES AND
PERCENTAGE OF VARIANCE COMMON TO SUBTEST AND COURSE GRADE

	ACT Subtests									
Freshman Course	English		Math		Social Sci.		Nat. Sci.		Composite	
English 101	.291	8%								
Math 112			.411	17%						
History 103					.194	4%				
Biology 101							.394	15%		
Overall GPA	.311	10%	.224	5%	.257	7%	.236	5%	.312	10%

Table VIII-B

HIGHEST OBSERVED CORRELATION OF ACT SUBTEST WITH ANY COLLEGE COURSE GRADE

Freshman Course	English		Math		Social Sci.	Nat. Sci.	Composite	
English 101	.291	8%						
Math 112			.411	17%				
History 103	.295	9%						
Biology 101							.398	16%
Overall GPA	.311	10%					.312	10%

The Remediation System

Success in an academic course is a problem of expectations. There is the expected level of prior-accomplishment which an instructor has of each new student enrolled in his class. There is also the expected level of accomplishment which the student should meet at the completion of the course.

Where the instructor's expectation and the actual prior accomplishment of the student differ greatly, the student will not do well in the course no matter how hard he may work. Because this is a widely observed "cause" of failure to satisfy expectations of accomplishment, effort has been made to identify what instructors in a given subject area expect in the way of prior accomplishment. These minimum expectations or prerequisites for a course should be the same from instructor to instructor. This is demonstratably not so. Where a department has succeeded in reaching a fair degree of agreement between instructors as to what entry level of accomplishment is necessary, the accuracy of prediction is greater.

The more clearly and more detailed the prerequisites can be written out, the easier it will be to determine which students meet the prerequisites and which need remediation. The prerequisites of entering ability must, therefore, have a direct relationship to the abilities to which grades are assigned. For example it makes no sense to assign a student to a remedial section on the basis of spelling or computational accuracy when spelling or computational accuracy are not a major factor in success in the course in question.

That this is a common problem is exemplified by the following excerpt of an article published by ERIC.[8]

> "The omnipresent example for the comprehensive community colleges is the placement of students in a transfer college English course or in one or more courses in remedial or repair English. The stated purpose of the remedial program is preparation for the transfer course. However, any college that has bothered to systematically appraise the success of remedial English as preparation for college English has found almost total failure. The normal criterion variable for original placement involves grades in high school courses or, more often, scores on standardized tests. Yet the content of the college English course deals most often with essay writing and, to some extent, analysis of literature. What are the entry skills that are required to write a freshman theme? The armchair English teacher will immediately respond with a list of abilities measured by the standardized tests, i.e., grammar, spelling, vocabulary, mechanics, etc. ...It would be more useful simply to have the students write sample compositions and let it go at that."

If it cannot be stated with accuracy that a student will not succeed in a given course, there is no real justification to the student for not permitting him to attempt it. This becomes particularly important where course credit is involved. A student who could have successfully completed a credit course is severely penalized by being coerced into taking a non-credit and unrelated course instead. As Dr. Harold D. Reese[9] explains, "Loss of credit means not only extra outlay of cash for additional courses but also frequently a delay of a year or more before completion of the degree. This delay may cause a loss of thousands of dollars (first year's earnings) and a year or more of service credit toward retirement."

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[8]M. Stephen Sheldon, Director UCLA/Danforth Junior College Program In ERIC Junior College Research Review, Vol. 5, No. 4, Dec. 1970.

[9]The Assistant Director in Certification and Accreditation for Maryland State Department of Education.

This study includes 1379 freshmen students who entered Montgomery College Fall 1969. The purpose was to analyze the relationship between high school grades, ACT scores, and first semester college grades. The average of the four high school grades included in the study was "C". On the American College Test the Montgomery College students failed to reach the national norm of all college freshmen but surpassed that of two-year college students. Specific first semester course grades were on the average below national norms except for English 101 which was equal to that earned by all college students. However, the overall grade point average of Montgomery students was higher than that of college students nationally.

When high school grades and ACT scores were correlated with first semester college grades, the greatest predictive accuracy was obtained for Math 112 and Biology 101. While English 101 and History 103 produced positive correlations useful for predicting purposes, these indices cannot be considered strong or highly efficient. Except for Biology 101 the ACT scores proved to be better predictors of academic success in college than high school grades. In no subject area do the college's predictors reach the level of efficiency enjoyed by over 50 percent of the schools involved in ACT's Standard Research Service.

Academic success is predicted more accurately for the career student than for the transfer student at Montgomery, and for these students high school grades are a better predictor than ACT scores. However, ACT scores are more efficient than high school grades when predicting college grades of transfer students.

The findings of this study indicate that high school grades and ACT scores are useful in counseling entering students but that they should not be used as the only criteria. When a student's high school grades and test scores are divergent, the counselor could advisedly weight one more than the other depending on the goal of the student. So long as the relationship between basic language skills (as measured by ACT) and English 101 grades remains weak, the policy of urging students with low ACT scores to enroll in non-credit eview programs does not appear to be justified.